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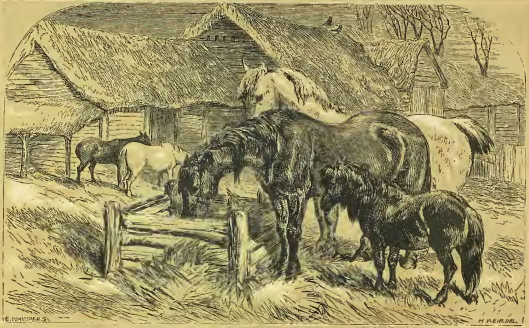

E. WHIMPER S.
H. WEIR. DEL.

THE STRAW YARD.

THE HORSE:

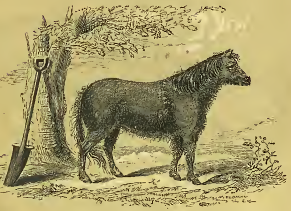
ITS VARIETIES, BREEDING, AND MANAGEMENT.

BY H. D. RICHARDSON,

AUTHOR OF "DOGS," "PIGS," "THE HIVE AND THE HONEY-BEE," "DOMESTIC FOWL," "THE PESTS OF THE FARM," ETC.

A NEW EDITION, REVISED AND ENLARGED,

BY M. M. MILBURN.



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AND HARRISON WEIR.

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THE HORSE.

INTRODUCTORY.

The great improvements which have taken place in every branch of rural management, since the first edition of Mr. Richardson's little book on the Horse appeared, have rendered the enlargement of the work so necessary, that it may now, from the extensive remodifications it has undergone, be considered as altogether original. Vital chemistry, animal physiology, and the more general application of science to the veterinary art, which were formerly only known to the heads of that profession, are now much more extensively studied, with increased advantage to the breeders, dealers, and owners of that friend of mankind, the horse.

In the present edition the horse will be found classified according to his uses; but especial attention has been directed to the management of farm horses,—a branch of information which Mr. Richardson did not attempt to enter upon, but which is of vast importance, when treated practically, and by a competent practical authority.

Stable management, the stable itself, and the general treatment of the Horse, with a view to the prevention of disease, and increasing his capacity for work, have all in their turn received careful consideration. It has not been thought desirable to enter at any great length on the symptoms and treatment of diseases, to which the horse, from his artificial condition, is so peculiarly liable. In the words of the preface to the original work, the reader is "presented with a rapid summary of the most frequent and important diseases and accidents to which the animal is subject, describing their premonitory symptoms; and, in all cases where it can avail, instructions have been given for the preliminary treatment useful to be adopted until professional assistance can be procured. To do anything beyond this would be not merely useless—it might be mischievous. Veterinary surgeons are now to be found without difficulty in nearly every district; and written instructions, however minute, could supersede their services in no case beyond the most ordinary attacks, which most stable attendants are familiar with the mode of curing. In all such simple attacks, however, we have given the most efficient remedies; while, in cases of a more complicated nature, the proper treatment of an animal requires a thorough knowledge of his anatomy and physiology; and the practical study of his pathology is no less necessary than it is for the treatment of a human being under similar circumstances.

"As fully nine-tenths of the morbid affections to which horses are subject may be attributable to erroneous systems of management, it seemed more profitable to the reader to devote our space to describe the best modes for the *prevention* of disease, by persuading keepers of horses to substitute correct systems of management for incorrect; minute details have, therefore, been given connected with stable management, feeding, grooming, and whatever bears more immediately on the *preservation of the animal in health*;—on what, in short, is called by medical writers *hygiène*. Some remarks relative to these matters —and on the best modes of correcting or curing certain vices or *bad habits* so frequently incident to horses—will be found useful. It is only where brutality and ignorance take the place of kindness and judgment,—where from being a willing servant the horse is degraded into a fettered slave,—that the naturally noble gentleness of his nature is displaced by vice or insubordination."

It is probable that the readers of this little book will chiefly be found among those who have had very little opportunity of learning much about horses, or who wish to recal the knowledge they possessed on the subject in early life, rather as a source of enjoyment than of economy in the management of the horse. For the benefit of this class, our remarks have been rendered as plain and practical as possible.

In a commercial country like ours, there are thousands annually who find themselves, for the first time, in a position to keep a horse. The pretension every Englishman has to understand, instinctively, as it were, all the mysteries of horse-flesh, adds largely to the difficulty which persons so situated must naturally encounter before they really understand the subject. They are usually as much ashamed to ask questions on this subject as if ignorance of one of the most intricate branches of knowledge were as disgraceful as picking pockets. For the PRIVATE READING of this class—for the benefit of gentlemen of middle age who are ordered by medical advisers to take exercise on horseback—and for the tradesman whose increasing business requires the use of horses—we shall offer such advice as our own experience has furnished in purchasing and keeping a horse; while, for the benefit of the breeder and amateur farmer, we shall add the best practice and experience in breeding we have been able to procure.

There is a class of persons, and that by no means of limited extent, who can only procure a horse by purchase, and many of these may refer to our little book for information "how to buy a horse." This is a much vexed question, and, like many others, is easier asked than answered. A gentleman living in the country, with the usual attendants of a country-house about him, will have no great difficulty in providing for his wants; for, if he does not inhabit a breeding county himself, he is pretty sure to have friends who do, and who will be only too glad to recommend a suitable animal from the stock of one of their breeding neighbours, already half broken, which his own groom can easily finish, and form a *mouth* for. In towns, and especially in London, the case is different. To buy a horse in London, which, in the words of the advertisement, has "never been out of the hands of the breeder," would entail endless trouble on the purchaser, with the fair chance of a broken neck. The question, therefore, is—What course should the town buyer of a horse pursue, in order satisfactorily to supply his wants?

In London there is never any difficulty in supplying such wants, if you can resolve upon the proper steps. There are dealers in every class of horses, with whom you may treat with perfect safety, if you will only candidly state your particular wants to them. You will not get a *bargain*, for they are too 'cute for that; nor is it reasonable to expect it from a dealer,—they incur great expense, and run great risks in providing for your wants: for nothing is so uncertain, even with the best judgment, as horse-flesh; and dealers frequently give high prices for horses which turn out worthless, while their own reputation prevents them from thrusting any such animals into their customers' hands. Hence there is a sort of poetical justice in their occasionally meeting with an unexpected prize, the profits of which they appropriate to themselves. If you want a first-rate hunter or hack, and price is no object, go to Anderson's, Quartermaine's, or some other well-known west-end dealer. If you want one of good figure, without too many requirements of excellence, and about £60 is your mark, there are Dyer's, Osborne's, Collins's, and Dyson's, where you can be supplied, with perfect certainty that no improper advantage will be taken.

Again, if you are inclined to run some risk, and trust to your own or to a friend's judgment, you may suit yourself, at a much smaller sum, at Tattersall's, Dixon's, or Aldridge's, where very shapely and useful animals are sometimes picked up; but on no account go beyond £25 to £30 at either of these places, unless you have some previous knowledge of the animal. In buying there, you know nothing of the seller, and, although you *may* obtain a good one for these sums, you have no reasonable hope of having a better for a larger sum.

Finally, you have the daily column of horses for sale in the *Times*—said to be the most deceitful of all, though we know not why; for it seems to us that the very first step a *bona fide* seller would take, to get rid of a horse he did not require any longer, would be to advertise him. It is certain, however, that many of the horses so advertised are made up for sale; and you will rarely get a TRIAL of one of these horses until you have paid your money. When you have parted with that, you know your security for it,—you have the horse!

◆

CHAPTER I.

ANATOMY OF THE HORSE.

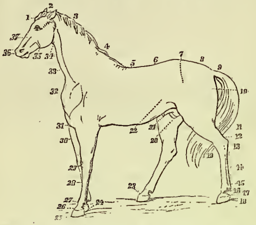
OF all quadrupeds the horse presents in his aspect the most perfect symmetry of form, and adaptation of part to part. His finely-arched back, his flashing eye, his expanded and almost transparent nostrils, his flowing mane, and his gallant crest, his wavy tail and powerful quarters, all present so many points of grandeur and beauty, calculated to rouse the admiration even of the most insensible beholder.

We must not, however, rest our admiration of this noble animal on his external appearance and form alone. They bear a secondary interest only to his other and nobler qualities of disposition, of docility, and of sagacity, which require but a brief acquaintance to appreciate. His services in war, in the chase, in travel, and, by no means the least, in agriculture, are familiar instances of those high qualities. To enumerate how he relieves man from the curse of labour, how he tills his fields, carries his person, conveys his comforts, his necessaries, his luxuries, and all this with steadiness, with intelligence, and often with affection, would exceed our space to describe. We may assert that there is no animal, excepting the dog, which so fully enters into the wishes, the wants, and the commands of his master at once, comprehending even his thoughts, and sympathizing with his animal spirits.

The genus *Equus* (of the family *Equidæ*) includes, besides the horse, the ass, the zebra, and quagga,—which all resemble each other in the structure of the skeleton, the number and form of their teeth, and in the digestive organs; their chief points of difference being length of ears, difference of hair, especially in the mane and termination of the tail, in the external markings, and general expression. The generic character is as follows:—Twelve fore-teeth, the upper six erect and parallel, the lower six more prominent; tusks solitary and remote; teats inguinal, and two in number; breathes through the nostrils, and not through the mouth; fights by biting, pawing, and kicking.

The horse belongs to Cuvier's sixth order of the class Mammalia, the *Pachydermata*, and the ninth genus. Its specific character is thus described by Cuvier:—Six incisors in each jaw, the canines, and six molar or cheek teeth, furrowed on both sides, with flat corners, and several ridges of enamel. Between the cheek and canines is a void space on each side, with a space between them, extending across the mouth, which is known to veterinarians as the "bars." The upper lip is susceptible of considerable motion; the eyes large, pupil oblong, ovate, placed laterally; sight good; ears small, pointed, and erect, possessing great power of mobility, which renders the hearing very acute; feet possessing only one toe, covered with a thick hoof; but under the horn skin of the hoof are the rudiments of other toes; tail furnished with long hairs; two teats, inguinal; stomach small, simple, and membranaceous; intestines and cœcum very large.

The horse may be divided into three structural parts,—the HEAD; the CHEST, OR TRUNK; and the EXTREMITIES, OR LEGS. All these parts of the horse should be in strict uniformity and perfect symmetry. The head, as a general rule, should not be large; but this is far less important than the proportion of its parts to each other. No part indicates higher breeding than the crest, which should be broad and angular in the blood horse, and gradually tapering to the muzzle (36); the eye should be large and full; the jowl (35), or jaw-bones, wide; the ears small, thin, and fine. The head consists of six bones:—1. The crest, or ridge of the parietal bone. 37. The nasal bone. 36. The inferior, or maxillary bone, containing the nippers, or under incisor teeth, and forming the muzzle. 35. The inferior maxillary, or under jaw; in the centre, between 35 and 37, is the superior maxillary, or upper jaw. The orbits, or cavities for the eyes, are formed by the union of four bones of the cranium and three of the face, so connected together as to obtain the widest sphere of vision with absolute protection to the organ. Following the figures of our engraving, 3 is the continuation of the crest; 4 the withers, forming the neck, composed of seven cervical vertebræ, and containing a portion of the spinal cord. At this point a junction is formed between the scapula, or shoulder-blade, with the bones of the back (5), which consist of eighteen dorsal vertebræ; the bones of the loins (6) consisting of six lumbar vertebræ; the bones of the haunch, or croup (7 and 8), consisting of five sacral vertebræ, and of the tail, or dock, generally consisting of about fifteen caudal vertebræ. Through all these vertebræ runs the cavity containing the spinal marrow.



[1. Forehead. 2. Poll. 3. Crest. 4. Withers. 5. Back. 6. Loins. 7. Hips. 8. Croup. 9. Dock. 10. Quarter. 11. Thigh or Gaskin. 12. Ham-string. 13. Point of Hock or Ham. 14. Cannon. 15. Fetlock. 16. Large Pastern. 17. Small Pastern. 18. Hoof. 19. Hock, inner side. 20. Stifles. 21. Sheath. 22. Flank. 23. Coronet. 24. Heel. 25. Hoof. 26. Small Pastern. 27. Large Pastern. 28. Cannon. 29. Knee. 30. Arm. 31. Breast. 32. Point of the Shoulder. 33. Wind-pipe. 34. Gullet. 35. Jowl. 36. Muzzle. 37. Face.]

Connected with these vertebræ, and forming a most important part in the animal structure, is the trunk, or chest. Of this, the upper part is the spine; the lower part the breast, or shoulder. The bones of the back are eighteen in number, the first ten or eleven corresponding with (4) the withers, the others forming the back and loins. The ribs are usually eighteen on each side, seven united to the breast bone, or sternum, by cartilage, and called true ribs; the others, united to each other by cartilage, and called the false ribs. Where the latter are short, it is objected to by some as a malformation, and it certainly indicates weakness; but it is necessary to distinguish between shortness of the ribs, and mere spareness of body. When it actually exists it unfits the horse for heavy work or endurance, and indicates a want of capacity for feeding; but it sometimes accompanies speed.

Lowness of shoulder is sometimes mistaken for lowness of wither; and hollowness of back is objected to as indicative of weakness. The low-shouldered horse is not adapted for the saddle; but a good shoulder may exist with an appearance of lowness of wither; and where the horse is approved of in other respects he need not be rejected on that account without proper examination. Nor is the hollow back in a horse always accompanied with spinal weakness.

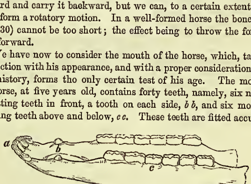
Next in importance, in the anatomy of the horse, are the shoulder and extremities. Following the figures of our diagram, we come to 10, the haunch, or quarters. This is composed of three bones, from which branches run up to the dorsal vertebræ at 9, where they are firmly united to the bones of the spine. The hip-bone is behind and below them, and its points are seen under the tail, where they are united to the thigh bones (11). The femur, or proper leg bone (12); from the inner part of the thigh opposite (11), proceeds the principal exterior muscle of the hind leg. The hock (13 and 19) is a most important point. This wonderful complication of bones and muscle is admirably adapted for its purpose; but, from its structure, it is often the principal seat of lameness in the hind legs. It is subject to *sprain* from violent concussion, and many other ills, for the cure of which the aid of a veterinary surgeon is necessary. The cannon (14), one of three bones forming the leg between the hock and the fetlock (15). The larger and smaller pastern (16 and 17), are, perhaps, the most important and most complicated arrangement of the animal.

The cannon, the large and small pastern, and the coffin or bone of the foot, rest upon each other in sockets; they are supported by three bones behind their junctions, and are retained in their places by various ligaments, admirably contrived for the purpose of preventing concussion. These are the *sesamoid* bones, attached one on each side of the top of the larger pastern, forming a continuation of the socket, in which the lower portion of the cannon bone turns; and the navicular or shuttle bone, a small square bone attached to the coffin bone, and forming with that the socket in which the pastern turns. The suspension ligament, originating in the head of the cannon, is attached to the splint bones, and descends the leg between them. Approaching the upper pastern, it separates, and the branches are inserted into each of the sesamoid bones, which they suspend in their places. A continuation of them is carried from these sesamoid bones to the navicular or shuttle bone, obliquely formed over the pastern, and meeting with the exterior or principal tendon of the fore part of the foot; at the back part of which, inside the frog, is the seat of navicular lameness. The common injury of the suspension ligament is sprain; rupture of it is a desperate case, demanding the prompt attention of the veterinary surgeon. The mechanism of the pasterns applies to both fore and hind extremities. The foot of the horse is composed of a horny external wall—ascending obliquely backwards from the ground, to the height of about four inches from the toe to the bar in front, gradually decreasing in height till it is about an inch and a half at the heel—the coronet (22 and 25), the coronary ring and band, the bars, horny laminæ, the sole, and the horny frog. The thickness of the crust in front is about half an inch, becoming gradually thinner towards the heel. In some horses the crust is much less; hence the necessity of care in shoeing.

The stifle joint (20) performs an important part in the animal economy. It is situated immediately under the femur, or thigh-bone of the hind leg, and answers to the knee-pan.

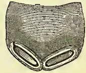
The knee (29), answering to the wrist, is a most complicated joint. Six distinct bones are placed here, each covered, both above and below, by thick cartilage, connected together with ligaments, but separated by interposing fluids and membranes. These six bones are arranged in two rows, wtth a seventh bone, the *trapezium*, so called from its quadrangular figure, placed behind them, which receives the lower end of the bone of the arm on the upper part, and the upper heads of the three bones of the leg on the under side. Owing to this arrangement concussion is spread over the whole of the leg, and thus rendered harmless. The knee should be broad and square, so as to allow space for the ligaments and muscles; for in proportion to breadth there will be strength. The sternum, or fore part of the chest (31), and the arm (30), are formed by the scapula. The humerus, or upper bone of the arm, forms with the scapula an oblique angle, the latter being considerably the longest. The humerus rests on the lower bone or radius, to which it is united close to the ulna or elbow, corresponding with the stifle joint of the anterior extremities. The advantage of the slanting angle of the scapula and arm is considerable, and worthy the attention of the horseman. It materially breaks the shock which would arise from any weight being thrown on the fore leg; and also assists the stride. Mr. Percival describes the shoulder-blade as "the segment of a globe playing like a spiral hinge within the cup-like concavity, occupying the apex of the scapula, there being no two bones in the skeleton whose articular connection admits of more varied and extensive motion than exists between the scapula and humerus." If we lift a horse's fore-leg, not only can we bring it forward and carry it backward, but we can, to a certain extent, make it perform a rotatory motion. In a well-formed horse the bone of the arm (30) cannot be too short; the effect being to throw the fore-legs well forward.

We have now to consider the mouth of the horse, which, taken in connection with his appearance, and with a proper consideration of his past history, forms the only certain test of his age. The mouth of the horse, at five years old, contains forty teeth, namely, six nipping or cutting teeth in front, a tooth on each side, *b b*, and six molars or grinding teeth above and below, *c c*. These teeth are fitted accurately and firmly in the gum, a singularly compact hard substance, so callous as to be almost devoid of feeling. For months before birth these teeth exist in an embryo state. When dropped, or a few days afterwards, the first and second grinders of both protrude through the gums, showing large in proportion to the jaw. Eight or ten days after birth the mouth of the young foal exhibits two central nippers, as in fig. 1, efficiently filling the entire front of the mouth. At a month old a third grinder appears; and before six weeks a



UNDER JAW OF THE HORSE.

1



second pair of nippers have appeared. The jaw now presents the appearance represented at fig. 2. At two months old the central nippers have attained their full growth, and at three months the second pair will be on a level with them. The outer edge, heretofore raised and sharp, will now be ground down, and be level with the inner one. In this state the mouth continues till the foal is eight or nine months old, when a third nipper presents itself, above and below, on each side of the two first pairs; thus completing the colt's mouth, as represented in fig. 3. From this time, till between two and three years old, the only observable difference is the wearing down of the outer edge to the level of the inner, while the blackened mark in the hollow of the teeth, originally long and narrow, is still strongly marked; but the mark on the central one is becoming rounder and fainter. At this age the mouth now appears as represented in fig. 4; the four teeth being almost level, and the mark on the last cut nippers most distinctly visible.

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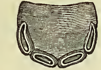

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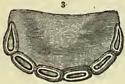

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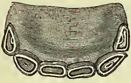

The grinders, or molars, so called from their lateral grinding action, are the back teeth *cc*; and the first pair appear about the time of birth. Before the expiration of a month, these are succeeded by a third, placed more backward. At the end of the first year, a fourth grinder usually presents itself, so that the yearling colt is furnished with six nippers and four grinders above and below. Making allowance for the nature of its food, and with due attention to the appearance of the mark in the nippers, the age of the foal may be reckoned from the mouth described,—that is, up to May of the year after birth, if it is a year old. At eighteen months all the nippers will appear flat, the marks on the two front ones rounder and fainter; and at two years old this change will be still more apparent. About this period also a fifth grinder presents itself. And now commences another process. The front teeth, or nippers, hitherto called milk teeth, gradually disappear by process of absorption, and the second or permanent teeth appear. This process is generally complete in the third year; but the permanent teeth have not yet attained the same level with the side teeth. At this age the central nippers are rather lower than the others, and still growing. The other two pairs wasting, with six grinders in each jaw, are the infallible signs of a three-year-old. From that age to four year old the next pair of nippers disappear, and their permanent successors will be up. Still small, and with a deep mark on the hollow, the sixth grinder will be on a level with the others; the two first grinders shed, and the tusks begin to appear. At this period the mouth is as represented in fig. 5. The tushes are two on each jaw, placed between the nippers and the grinders. At this age they are visible in the horse or gelding. At a later period in life, the mare sometimes exhibits them; but they invariably occur in the horse.

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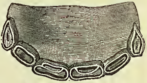

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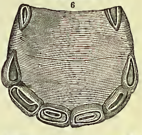

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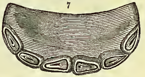

Between the age of four and five, the last pair of nippers disappear, and are replaced by permanent ones. The tush in the horse is now fully developed, and is about half an inch in height. The colt becomes a horse, and the filly a mare; and the mouth is usually in its most perfect state, as represented in fig. 6;—the last pair of nippers are full, the mark is long, deep, and irregular, and the other nippers show signs of wear. At this stage the horse has experienced his last change of mouth; he now sheds his tusks, or his last three pairs of grinders.

At six years old the mark on the central nippers is gone; but a slight black mark still remains. In the second pair, the mark is rounder and fainter, and the corner pair also show signs of wearing. The tusks are quite an inch in length, and tending to a point, the third grinder barely up, and all the rest of them on a level. Fig. 7 represents the mouth at this age, or from five and a half to six years of age.

At seven years old the mark on the four central nippers is gone, and is rapidly disappearing in the last pair; the tushes are becoming rounded. The rounding is completed at eight. While the marks have finally disappeared on the bottom nippers, they still remain on the upper jaw, and form a test of age for some years after they have disappeared from the lower one; but only great experience and judgment can detect the age after the animal is seven years old.

Numerous expedients are said to be resorted to by unprincipled breeders and dealers to disguise the age of their horses,—at an early age, to give them an appearance of greater age; at a later stage, to render them apparently younger. At two years old the colt is unsaleable. By feeding and nursing, and punching out or drawing the central nippers, the animal may be made to resemble a late three year old. At four year old it is still more important to give the appearance of a five year old horse; and the ignorant in horse flesh may be deceived by the second pair of nippers being forced, by cutting into the gum so as to expedite the growth of the tushes; but the initiated will at once detect the deception by the wear of the other nippers, by the legs, thickness of the mouth, and general appearance of the animal, especially of the eyes, which in old horses become dim and somewhat wrinkled.

The teeth of the horse are covered with a polished and hard enamel, which long resists the action of the mouth in nipping and grinding its food. The grinders of the lower jaw are both smaller and narrower than those of the upper. They have also the higher points of the cutting edge within shelving outwards, while the upper have the higher side out-shelving inwards;—this, with the lateral action of the jaw, produces the grinding action necessary for macerating the food.

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CHAPTER II.

BREAKING, OR TRAINING.

The breaking of horses is a process which requires a vast deal more care than it usually receives. The person professing to take up this calling is often the most unfit of all persons for the task. A cast-off groom—a servant whom nobody will employ—usually selects this employment in the absence of any other, and a valuable horse is committed to his charge. Indeed, the word horse-*breaker* and *rough-rider* are terms which show the savage character which too frequently attaches to an operation requiring the most gentle and delicate treatment. He ought more properly to be called a horse-educator.

The office requires, with much activity and firmness, the greatest possible coolness, good temper, and patience. The breaker must first gain the *confidence* of the steed. Unless he does this, his work is one of brute force, and opposed to all the instincts of an intelligent animal. To accomplish the operation properly is a work of time. The person who feeds the mother, when the foal is at her foot, is the best fitted to act as horse-breaker. If he is of a kindly disposition, and attached to animals, the mother will, by example, teach the foal to have confidence in him. He will thus find that the foal neither startles at his presence, nor resists his approaches nor handling, which should commence with the very infancy of the foal.

In the ordinary mode of breaking, the first operation is too often, after haltering and bitting, to tie the animal to a post, in the top of which is inserted a swivel, and there to leave him to walk round and round, while the breaker is perhaps smoking and drinking. While at other times, to save himself trouble, he will make the horse trot or walk in a circle, while he gently plies the whip round him. This is both an indolent and an objectionable method. It teaches the horse to contract a long step and a short one. The off foot will, if this is much practised, be found to step out further than the near one, and the horse will have the habit and appearance of lameness.

Another error is to mount a horse in a crowd. To be mounted at all is so novel a thing to a horse, that he is sure to be a little frightened; but if men and boys, with noise and whips, are hallooing about, the horse is terrified, and a bad habit taught perhaps in his very first lesson in riding. It is said of the celebrated trainer, Tom Middlemiss, that nobody ever saw him mount a horse for the first time. Indeed, if well and prudently trained previously, there will be no necessity for any such fuss. The back will soon become familiarized with weights; so that the well known friend, the educator, will be suffered to mount almost as a matter of course. If the horse is frightened at first, it is very likely that he will always refuse to stand when mounted.

Another serious fault is forcing the horse to walk faster than his natural action. In the breaker's anxiety to make a fast walking horse, he makes him only go in a jog-trot hobble,—neither a walk nor a trot,—the most objectionable pace, perhaps, of which a horse can be guilty.

A horse is sometimes injured by checking him too severely upon his tender mouth, when reducing him, say from a canter to a trot. So different are the actions, that a horse, inexperienced in paces, may easily be thrown on his haunches, and much injured by such treatment. This may be obviated by a very careful and gradual tightening of the rein, thus giving him notice that a change is desired. The horse will thus have the full command of his limbs in the change of the pace.

The desirableness of early breaking has already been spoken of. No greater mistake can be committed than to postpone this. It should, in fact, be commenced at the period of weaning, or as soon as the effects of castration have passed away. It should be commenced and prosecuted *gradually*, with gentleness and kindness, but with firmness. Let the young animal be daily handled, caressed and led about, and let him occasionally be rubbed down, and even at times tied up for an hour or so. The man who *feeds* should have the entire management of him at this time, and he should be characterized by equanimity of temper and a kindly disposition. Half the battle in horse-training consists in this early management. Many a horse is spoiled by improper treatment; and many, on the contrary, have been moulded into gentle, affectionate, and useful servants, by the judicious treatment of those who first inducted them into the knowledge of their duty.

For the first year such treatment as has been described will suffice. After the second winter the operation of training may commence in good earnest. The horse must now be *bitted;* but the bit first used must be small, and of such a form as will not hurt his mouth. The work of *bitting* may occupy three or four days, and, like everything else, should be done gradually. He should be taught to play with the iron first for an hour or two, and then for a longer period. When the colt becomes accustomed to the bit, he may then have two long ropes attached to it, slightly fastened to his sides by a loose girth over the back, and his feeder may thus *drive* him, as it were, round a field, pulling upon him as he proceeds. This will act as a first lesson in *draught*. If intended as a saddle horse, a pair of sand bags may be thrown across his back, and secured there. After a while, when he has become used to this, two pieces of wood secured in the position of a St. Andrew's cross, with a rein from the mouth attached to each, may be fastened upon his back, the inferior extremities grasping his sides, and thus inuring him to the *legs* of a rider.

Portions of harness may now, from time to time, be added,—the *winkers* being kept for the last. He may now be put in a *team*; and it is better that he should be one of *three*, having one horse before and the shaft horse behind him. It is best to begin draught on grass, where the colt will not be frightened with the noise of the wheels. He has enough to occupy his thoughts without that, and the grand secret consists in not hurrying or confusing him. Let everything proceed gradually and by successive stages; and, above all, let no *whip* or *harsh language* be used, or the horse may be irretrievably ruined.

Breeders of horses are very apt to postpone the breaking of them to a period comparatively advanced, and then they fancy that the training can be perfected at once. We have endavoured to show that the work of training should be a gradual and progressive one, and that it should rather consist of a consecutive system of judicious management than a separate operation, suddenly undertaken and summarily performed. If the colt has been treated as has been recommended, much subsequent trouble will be saved to his owner; and if it were generally so treated, there would be fewer instances of vice and sulkiness displayed by the adult horse.

All horses, especially such as are required for agricultural purposes, should be broken into the saddle as well as to harness. This is easily effected when once the animal has suffered himself to be yoked in the *team*, as already described. Let his accustomed feeder and handler be the first to mount him. There is no doubt that the colt will suffer him to do so without struggling; and *gentleness alone* is required to complete the lesson thus auspiciously begun. At the same time that mildness is absolutely necessary, it is not the less essential that the colt be taught *implicit obedience* to the will of its master. For this purpose, however, neither the whip nor spur need be employed, nor need he be shouted or hallooed at. Nothing is required but *firmness*, *steadiness*, and *patience*—the three great requisites in a successful horse-breaker. If he fails once in his lesson, try him again and again, until he has accomplished the object.

When the colt has acquired the art of *drawing* and *carrying*, it will be time to instruct him in what is perhaps the most difficult part of his duty—*backing*. This must be done *cautiously* at first, by the *long rope*, as already described, and gradually. Let first a light cart and then a loaded one be added; and let care be taken *not to hurt the mouth* with the bit. Patience and gentleness will effect everything; a contrary course of treatment will generate vice. Few horses are naturally vicious. It is cruel usage which has first provoked resistance.

A similar system of quiet but determined treatment is to be observed in breaking horses for hunting or racing. At about three years old the regular course of training a hunter begins. The colt is first accustomed to be led, and to endure the rein; he is then *rung*, or "lounged," as it is called, upon soft ground, which should never be performed except to teach the horse the action of cantering, which is, *at first* perhaps, best taught in a circle. After several days' practice in the circle, both from right to left and from left to right, he may have the pieces of crossed wood placed on his back as we have before described. He is next mounted, and gradually taught his several paces, from the walk to the trot, canter, and gallop. Each portion of the colt's duty should constitute a separate lesson, and be taught him perfectly and thoroughly before proceeding to the next. The earlier lessons should be short; but as the animal's education advances, they may be increased in length, always, however, taking care not to push them to such a pitch as to produce absolute fatigue or disgust.

When accustomed to his paces, the colt may gradually be brought into the thoroughfare, and at length into the street. In this, of course, much caution must be used; and if the young animal displays symptoms of shying at any object, he must be cautiously brought to approach it, and made sensible of its innocuous nature. All these exercises he should be taught on every possible variety of ground—whether flat, hilly, broken, meadow, or ploughed.

It would far exceed our limits, were we to enter into a lengthened dissertation upon horse-breaking generally. We have done enough in explaining the principle. Any man possessed of common understanding, united with a moderate share of tact, courage, and skill in riding, can effect the rest.

Having now supposed your horses reared, broken, and in actual service in their respective occupations, it will naturally be expected that some advice should be given relative to their feeding and general management, as distinct from draught horses, to which a chapter is devoted elsewhere.

CHAPTER III.

FEEDING AND GENERAL MANAGEMENT.

Half the disorders to which horses are subject may be traced to one of two causes—1st, too close confinement in ill-ventilated stables;

2nd, want of sufficient shelter; and exposure to all weathers, and at all seasons, in the open fields. There is a third serious fault frequently committed in horse management—it is over-feeding with *hay*. This applies more particularly to young horses, and to such as are not put to severe work. They are placed behind a full rack, and they eat for amusement, until at length the stomach gradually becomes preternaturally distended. The appetite gradually increases in a relative proportion, becomes sooner or later voracious, and finally merges into a mere *craving*—it being a matter of indifference what the food is, so that the stomach is filled by it. This depravity of appetite is always accompanied more or less by thirst. I have known instances of a horse, when so affected, drinking *stale urine* at the dung tank; and I have read of instances where *hog's wash*, and even on one occasion *whitewash* was drank, to the serious injury of the horse's mouth and stomach. This devouring of trash produces general debility of the entire digestive functions, including stomach, bowels, liver, spleen, and pancreas. Worms are produced in thousands, and symptoms present themselves of so many varied hues, that enumeration, far less classification, becomes impossible.

A horse's appetite is not to be taken as the criterion by which to determine the quantity of hay he is to be permitted to consume; for most horses will eat three or four times as much as they require. Horses have been known to consume thirty pounds weight of hay in the twenty-four hours, whereas ten to fourteen pounds is the most that should have been given during that time. Upon eight pounds of hay daily, with a due allowance of oats, a horse can be kept in full work, in prime health and spirits. It is better to keep young horses at grass until about five years old, and to work them at light work during the last two years of that period. When kept in the stable and not worked, they are apt to acquire many very bad habits; and if the rack and manger be kept empty, with a view to prevent their overloading their stomachs, they will fall into a habit of playing with and mouthing them—a habit which will finally degenerate into wind-sucking or crib-biting.

The great desideratum in a stable is *ventilation*. A horse requires air equally with his master; and our Chapter on Stable Management gives the best information we possess on that subject. The necessity of cleanliness, however, cannot be too often impressed on all having charge of horses. A few buckets of water dashed over the floor of the stable while the horses are at work, or, if hunters, while at exercise, will keep all sweet. The litter should also be turned out to dry, and a little fresh straw spread for the horses to stale on. A shed placed beside the stable is a great advantsge, on two accounts—it admits of the litter being dried, and the horse dressed there in wet or stormy weather, where a cleaning house, which is perhaps better, is not attached to the stables.

A little powdered gypsum, strewn upon the stable floor, will also act in absorbing the ammoniacal gas, and thus removing both the foul smell and the gas—frequently a predisposing cause of ophthalmia. Should the ammonia, however, have accumulated in any quantity, the speediest and most efficacious remedy, as a disinfectant, is the laying down a plate or dish containing muriatic acid: or, as is practised in some stables, a layer of peat charcoal strewed under the litter will effect the same object.

Having spoken of stable management, and its natural concomitants dressing and grooming, it is necessary to devote a few words to the consideration of *horses at grass*. House-soiling is supposed to possess considerable advantages over grazing; for not only will the animal be preserved in *harder condition*, but his *dung* alone will go a considerable way towards paying for his keep. Still there are certain months of the year when putting the horse to grass will be productive of decided improvement in his health. It will invigorate his constitution, renovate his health, and serve, in all respects, in place of medicine. The time for turning the horso to grass is from the middle of May to the end of August. Horses in constant work, however, should not be suffered to be out at night after the end of July. When first turned out, horses are apt to make too free with clover and other such rank and luscious feeding. They should not, therefore, be turned into the richest pasture at first. Clover, vetches, sainfoin, lucerne, are all very excellent descriptions of feeding, whether the horse be suffered to graze on them from the field, or be given cut in his rack in the stable. To these may be added Italian rye-grass, the value of which is beginning to be appreciated of late years more than ever.

Nimrod altogether disapproves of turning out to grass; and agreeably to his advice some of the best studs in the kingdom are conducted. In treating on this subject, in his work on the condition of hunters, his first sentence is full of truth :—

"Had some sensible and rational groom given to the world the result of his practice in the stable, I should not have taken up my humble pen on this subject. He would have been better qualified for the task. But I have never given my grooms control over my horses, even in the stable; acting on the principle that two heads may be better than one, and that the person who rides the horse is the better judge of his state than the person who cleans him."

The following may be called "Nimrod's maxims:"—

1. The situation of a hunter well ridden up to hounds is one of great peril and danger. On the horse being in condition depends, not only the place the rider is to maintain in the field, but his safety in that place.

2. A horse is said to be in "condition" when he is full of flesh, has a shining coat, and a healthy look. He may have all these, and yet he may be incapable of exerting his powers with effect. It is more by feel than by look that his condition is tested.

3. Never give a hunter a "summer's run at grass," and, except "under very favourable circumstances, never turn him out at all."

To this maxim we have already taken certain exceptions; but the author's experience is too great, and his views on this point too decidedly mixed up with his other maxims to be omitted.

4. The pace of a hunter is now the pace of a race-horse; and the preparation should be the same, or he has not justice done him. It takes twelve months to bring a racer to the starting-post.

5. All measures which tend to throw nature out of her destined course by violence are bad. How, then, can we reasonably expect that a horse, turned out to grass for the summer, and taken up in August, should be in a condition to go to hounds by the end of October, when we are assured that the race-horse requires twelve months' preparation. In turning out, if horses get soft and fleshy, great risk is run of injuring their legs, by the exercise necessary to get rid of the load of flesh they have accumulated, and recover condition.

6. In the act of grazing, great pressure is laid upon the sinews of the fore-legs of most hunters; this is especially the case with horses which have been reared on corn. Turning out, therefore, is by no means a season of rest to the animal, but the reverse.

7. To sum up, according to Nimrod,—turning out is destructive to condition, and it requires great length of time to recover it, besides the annoyance to the horses from flies, with its attendant evils.

When we proceed impartially to review the two systems which we have endeavoured to explain, it will probably be found that truth lies between them; for, after bringing forward many arguments—(among others the condition of post-horses, always ready for work, and sleek and smooth in their coats, even after a second nine mile "out and home,"—in addition to numberless instances of hunting-studs where the "turning-out" system is adopted, and condition rarely if ever recovered till the hunting season is half over, contrasting them with others where the inn-door system is pursued, and the horses always ready),—Nimrod goes on to say:—"Lest it should be supposed that I am averse to turning out hunters at all, it will be better to explain. So far from being averse to it, I strongly recommend it, under favourable circumstances. In cases of blistering, and after firing, it is almost necessary; but then they should only be turned out at night, and in places where there is little grass; and they should have two, if not three, feeds of oats a-day, with a few vetches when they are young and tender. The smaller the paddocks are the better, as it is not food that is required from them, but exercise."

It will thus be seen that a moderate adaptation of the views we have advanced are not irreconcilable with those entertained by NIMROD. We would adopt as a preventive what he recommends as a cure.

If the weather be wet or cold, let the horses be taken in during the night; and let the field be provided with trees, a shed, or other similar shelter from the rain or sun. If you make them work as usual, give a feed of equal parts of oats and chaff each morning, two hours before putting on the collar, and the same on return from work before putting them out. This is necessary to working horses, as a counterpoise to the *green food* which forms the staple of their diet. Much absurdity has been written as to the necessity of bleeding, purging, and what not, consequent upon every change of food. The only precaution necessary to be observed is, to effect the change gradually, and to *work* or exercise the horses while it is going on.

Idleness is the cause of more ailments than ever arise from change of diet, among the finer descriptions of horses, at these seasons. As winter approaches, the horses are to be taken up from grass, both because at that season the herbage becomes watery and innutritious, as well as scarce, and because the weather is usually too cold for constant exposure. There can, however, be no precise rule of month or day laid down to direct you. You must be able to judge of your horses' condition and capabilities, and of the state of the weather peculiar to the season. The first step, however, will be the housing at night, and turning out in the daytime.

As to the general feeding of horses—let them be always *fed* *according to their work*. The materials, besides those enumerated, are various: split peas, split beans, oats, barley, chaff, chopped straw potatoes, turnips, carrots, bran, &c. In Ireland it is too much the habit to feed working horses exclusively upon *oats*, with *hay* as usual, and that too often *ad libitum*. In England the matter is better understood; and beans, peas, and various sorts of root are advantageously substituted for the oats.

We have already shown the waste of hay that takes place in stable-fed horses, and how it may be avoided. This avoidance of waste is of itself a piece of important economy. You will often hear people talk of *hard* and of *soft* food; and, on the other hand, you will hear others cry down these expressions as absurd. *Literally*, the expressions are erroneous; but the meaning intended to be conveyed is strictly correct. It is true that every description of food, whatever may have been its consistence prior to its reception into the mouth, will, upon elimination, become converted into the same homogeneous mass. It is, however, not the less true that some substances are rich in *chyle*-producing powers, while others possess a greater amount of watery or diluent matter. The former is hard feeding, the latter soft. A due proportion of these two descriptions of feeding must be maintained, if we wish to preserve the horse in health and condition. It is, however, unnecessary that these two descriptions of diet should be introduced into the stomach in their crude state; on the contrary, it is more advantageous to prepare them previously, and present them to the digestive organs in a state partially changed, when they are more ready to be assimilated. This saves the digestive organs much unnecessary labour, and the work of chymification proceeds with much greater rapidity.

This mode of feeding horses was tried, some years ago, by Mr. Croall, an extensive coach-proprietor in Scotland. It was, we believe, at the suggestion of Captain Cheyne, who had at the time become connected with the coach business, that it was tried. The post-boys at first loudly protested against the innovation. They declared that the horses could never work as before on the new food, decrying it as *soft diet*, and insisting that without *hard feeding* it would cause *purging*. Fifteen pounds of the following mixture were given to each horse :—

10	bushels of cut straw	90 lbs.
6	,, bruised oats	174 ,,
1	,, bruised beans	59 ,,
		323 lbs.

Or separately to each horse :—

Oats	8 lbs.
Beans	2¾ ,,
Straw	4¼ ,,
	15 lbs.

And at night the following mixture, 25 lbs. to each horse :—

1 boll of potatoes, at 7s. 6d., 5 cwt., steamed	560 lbs.
Fine barley dust, at 10d. per stone	36 ,,
Cut straw, at 6d. per stone	40 ,,
Salt, at 3s. per cwt.	6 ,,

From this it appeared that the daily cost of each horse per day was 5d. for supper, and about 1s. for forage and cookery—about 1s. 6d.—wages of feeder and cook, and expense of fuel included. It was also found that the horses were able to stand to their work, on this system of feeding, far better than they had been able to do on the old. It therefore became apparent, that not only was economy of feeding attained under the new mode of management—the cost of each horse being somewhat under 9s. per week—but that the animals were actually in better condition, able to go through a better day's work and, consequently, to *pay better* for the expense of their keep. The above result reminds me of a similar experiment, tried with reference to *pigs*, recorded in detail in my work on those animals, and which proved equally successful.

While the common farm-horse often passes years upon grass or hay alone, and, if not hard worked, supports himself in tolerable condition, harder food is required for the carriage-horse and hunter. For these a more nutritious, more *condensed* substance is required. Throughout the greater portion of the British islands, this desideratum has been chiefly furnished by the use of OATS. Oats are of a highly nutritious quality. In 1000 parts, they contain 750 of nourishing matter. In most parts of the continent of Europe, BARLEY is the staple food of the horse in lieu of oats. It is more nutritious than oats, containing only 80 parts of non-nutritious matter in every 1000. Barley, however, does not appear to agree with all constitutions, being of a heating or inflammatory tendency; *surfeit* and *mange* being frequently consequent upon its continued use.

WHEAT contains still more nutritious matter in a given bulk than barley, but it is not so good for horses. It contains more *gluten* than any other sort of grain, is more difficult of digestion, and apt to form congestion in the intestines; it also adheres to the teeth in a disagreeable manner. This has, however, only been proved in instances where spoiled or damaged wheat has been given.

BRAN, the ground husks of wheat, acts upon the bowels, when given occasionally, as a gentle aperient. It must not, however, be made a frequent food, far less a constant one. Both bran and pollard have been found to accumulate in the large intestines. When bran is given, let it be in the form of a mash.

BEANS contain somewhat less than 600 parts of nutritive matter in the 1000, but they are a most valuable food, eminently calculated for horses on hard work. There is a fact in connection with food, whether as relating to man or to the brute creation, that is scarcely even yet sufficiently understood, viz., that the food which contains and shows by analysis the greatest amount of nutritive ingredients, is not of necessity the most nutritious. Beans possess a remarkable instance of this fact, and one worthy of attention.

PEAS possess, in a slight degree, more nutritive matter than beans, and are said to be less heating. They should, however, never be given *whole*, but be always previously *crushed*. If swallowed whole, they are sure to swell considerably in the stomach, and painfully to distend it. Peasemeal is considered good food for the horse, and a remedy for certain diseases of the urinary organs.

A mode described by Mr. Brown, of Elgin, who details the plan on which he fed from twelve to twenty horses for upwards of twenty-five years, may prove both interesting and practically useful:—

"In the first place, the *straw* of wheat, barley, oats, and peas is the only fodder I have given my horses for the above period, and their *feed* or *bait* has been all *prepared*. I have, close to the stables, an apartment in which is placed a boiler about 300 gallons contents, and a steamer capable of steaming 20 bushels of potatoes. In the boiler I prepare a mixture of chaff, yellow turnips, and about a bushel of *lights*, or dressings of barley, oats, or peas. The light grain and chaff are mixed, after being carefully sifted, and put into the boiler layer about with turnips, which, if large, are cut into three or four pieces, along with about fifty gallons of water, making the boiler *bumper full*. When the steam begins to appear at the top of the boiler, a small quantity of salt is strewed on the top of the mixture; and by the time the steam ascends freely from the boiling substance, it is time to damp the fire, as it is found that the heat from below sufficiently prepares the upper layers, and that to continue the fire longer only wastes fuel, and overdoes the bottom of the mixture.

"When the heat has so far subsided as to allow a person to remove the mixture without inconvenience, it is thrown into a cooler placed close to the boiler, and is given to the horses at the rate of a common stable pail-full each, twice a-day, when they are working short time, and thrice a-day when they are working long time. In this way I feed my horses from the first of October till about the middle or latter end of April, by which time the spring corns are generally all thrashed out, and the lights or dressings accruing from them exhausted. From that time I substitute steamed potatoes for the mixture. These I carefully wash before putting them into the steamer, and to them I also add a little salt during the steaming process. They are also given twice and thrice a-day in the same quantities as the mixed food. The potatoes I steam every day, as, if kept overnight, they become glutinous and indigestible, and are dangerous to horses given in such quantities as I have mentioned; but, if fresh steamed, they may be given in any quantity. The steamer has a false bottom, through which the liquid or juice is drained off from the potatoes; when thus prepared, the potatoes are as dry, clean, and mealy, as those generally used at table. I find them excellent food for horses doing farm work; indeed, I would prefer them to any other food; but potatoes are a bad cleaning crop, and do not suit my rotation; hence I grow few of them, but just manage to have a sufficient supply to carry on my working stock from the middle of April to the first of July, when I have fullness of grass, either for pasturage or for soiling my horses till the first of October."

For the last few years the potato crop having been deficient, it is not unnatural that fears should be entertained for the continuance of scarcity. We would therefore recommend, as a substitute for them, *corn*, ground or bruised, to be combined with turnips, carrots, or parsnips, whichever indeed of those vegetables should happen to be most plentiful. Indeed corn, in combination with roots boiled or raw, forms a valuable article of diet for graminivorous quadrupeds. Horses, cattle, swine, and poultry, will eat the mess with avidity of appetite calculated to excite surprise at first. The mess—to which a little salt should invariably be added—will keep them in fair average condition. For those which it is desirable to fatten, many have a small quantity of pea or bean meal added.

It is quite impossible, however, to give the same substitutes for hay and corn either to the hunter, the racer, or even to the roadster or hack, which may be given with advantage to farm horses. The great staple of their food will always be hay and corn. That the quantity of both may be diminished by cutting the one and crushing the other, cannot be for one moment doubted; but as a certain quantity of food must always be given, a little fresh straw may be placed before the animals, who will always eat it with relish. It is amusement for them, and relieves the *ennui* arising from being immured in a stable.

Great attention is requisite in selecting the *hay*. That it is dried grass is generally enough for some grooms; whereas, there is a great difference between grass produced on one kind of land, and that *grown* on another. The herbage of the valleys, of the mountain limestone of England will, as a rule, only feed cattle. Though differing but very little in kind, there is a great difference in degree of the materials necessary for the different kinds of hay. The composition of the hay of these valleys is thus given by Spence, whose analyses and investigations on the composition of soils and grasses is but too little known:—

Potash	in 1000 parts	9·902	Oxide of manganese,	in 1000 parts	·210
Soda	,,	6·354	Chlorine	,,	·002
Lime	,,	7·909	Sulphuric acid	,,	3·085
Magnesia	,,	2·535	Phosphoric acid	,,	2·367
Alumina	,,	·500	Silicic acid	,,	15·737
Oxide of Iron	,,	·012			

Contrast this with a sample of hay from the millstone grit substrata,—a poor soil,—as below:—

Potash and soda,	in 1000 parts	14·630	Sulphuric acid,	in 100 parts	1·558
Lime	,, ,,	4·953	Oxides of iron and manganese ,,	,,	·035
Magnesia	,, ,,	1·769	Phosphoric acid	,,	3·451
Alumina	,, ,,	·100	Silicic Acid ,,	,,	17·650
Chlorine	,, ,,	·010			

Now, in the last of these analyses, the inorganic elements of flesh, and bone, and sinew, form the largest constituents, and a soil rich in these elements of restoration will yield abundance to the plants that grow upon it; and hence hay, turnips, and even corn, grown upon such soils will, bulk for bulk, and weight for weight, be much more nourishing than that grown on poorer land.

Good hay should moreover be well "got in." It should not, if possible, be exposed to wet in this rainy climate. The rain at first washes out the best and most valuable parts of the hay, which soon produces an incipient state of decomposition. It must also be stacked in a dry state; that is, the juices must be dried up so far as to prevent the heating of the stack. If the natural saccharine juices are not dried up to a very considerable extent, the fermentation, so necessary to the making of good hay, will run on to heating, and the stack becomes *mow burnt*. Hay in this condition must never be given to horses; it has a strong diuretic effect, and is very injurious to their health. On the other hand, the hay must not be "got in" too dry, otherwise it will not ferment at all. The great defect of the French hay is, that it is all woody fibre, and has not undergone thorough saccharine fermentation.

But great care must be taken, if the hay has been wet, to take away all the extraneous moisture by proper drying. Hay put into a stack when the natural juices are imperfectly dried, differs considerably from hay which has been wet from rain and not fully dried; the first excites over-fermentation, produces brewing, and becomes "mow-burnt;" the other will produce mouldiness, render the hay unhealthy, and induce disease of the lungs and broken wind; when husky breathing will follow.

The *oats* are also liable to the same faults. They may either be mow-burnt or mouldy; but, as the outer coat is a protection from the latter, they will do less injury than mouldy hay. Over-heated oats, however, are absolute poison to the horse, and ought never to be given on any account whatever.

Another desirable quality of oats for high fed horses is, that they should be recently thrashed. They keep by far the best and sweetest in the stack. If chambered, and not very carefully turned and ventilated, it is almost impossible to prevent them becoming musty; and acquiring the peculiar odour of decay. Neither must they be *new*. To give a horse oats grown in the same year, before Christmas is turned, will make him perspire. So much consolidation of the juices should take place as will render this very necessary aliment both digestible and sound.

As the hunter and race-horse must have as many oats as he can eat in seasons of hard work, care should be taken to have them of the best quality. Hence the Hopetoun and Potato Oats, which have a large amount of farina in a thin skin, are always the best. The colour should be a delicate white, and they should be free from all smells which would be disagreeable to the horse. Of the kinds of straw, and indeed, on the use of straw at all, for first-class horses, great difference of opinion exists. When a horse has plenty of corn and hay, a little straw of any kind, if fine and sweet and fresh, will afford variety, and do good. It will also prevent nausea, and give employment sufficient to dispel the ennui so productive of bad stable habits.

The writer always prefers *oat* straw; but many practical and scientific writers speak more favourably of wheat straw. Nimrod goes so far as to say, "I am not only convinced that to the fact of the horses in France eating as much straw as hay, is to be attributed their general healthy condition; but I was informed, by Lord Henry

Seymour, at Paris, that his race-horses, then of course doing good work, were eating nothing but wheaten straw and corn;" and this we are persuaded was far better than the usual Parisian hay. Barley straw is usually considered the worst; and when horses are made to feed on this they must have an ample allowance of roots, linseed, and some such aliment. Of roots, carrots have always had the preference; not so much, perhaps, because they are absolutely nutritious, but because they act slightly on the bowels and kidneys, and are much relished by the horses. Through the bowels they react on the skin; and there is no root with which the stud-master is acquainted so valuable for the coat as the carrot. The degree of substitution for corn will of course depend on the work. Allusion has been made to the use of carrots alone for farm-horses; and an Essex gentleman is mentioned who absolutely hunted his stud regularly twice a-week, which was fed on them. They had one bushel each per day, with hay, but no corn substitute. They would not probably have been able to follow the foxhounds with such food; and it is not improbable that the hay might have been grown on the banks of some alluvial meadow, and hence for nutritive purposes be nearly as good as some hay and corn.

Bruised furze is amongst the extraneous kinds of food used in some places for the keep of horses. In Spain and France it is common food for hard-ridden horses. The British army, under the Duke of Wellington, in the Peninsular war, and especially in the Pyrennees, had no other forage than this for their horses. For mares, young horses, and partially for roadsters and horses in moderate work, this food is useful; and some of the experiments made are interesting. Mr. Tytler, in a communication to the Highland Society of Scotland, estimated the daily cost of furze feed per horse, from November to February, at 5¼d., and from February to March about ninepence. His calculations, however, included straw, which he reckoned at as much as threepence per day, and he allowed nothing for the furze itself, as it was probably growing on land producing it in a wild state. But he allowed about three pounds of oats per day in the last month, for which he made the calculation. On soils where the growth of hay or corn is unprofitable, the gorse will thrive; and in climates where no other edible productions can be reared, they will soon make head, and be an abundant crop.

Beans constitute an excellent addition to the food of the horse, where great muscular exertion is required. For coach horses they are indispensable. Mr. Ward once said, according to Nimrod, as the hounds were settling to the fox, "Now, we shall see what horses eat old oats, and what horses eat new;" (and, adds Nimrod, he might have applied the distinction to those that eat beans, and those that did not); for, says he, "They help to bring him home at the end of a long day, and support his strength in the run." The same remarks apply to beans as to oats in reference to their being old, new thrashed, and free from mould and moistness.

To sum up;—Stewart, one of the best writers on stable management, gives the following epitome of the principles of feeding, with which (at least with its spirit and some slight modifications), we conclude these general remarks:—

When the horse has to work as much and as often as he is able, he should have an unlimited supply of food.

When the work is of a kind to injure the legs more than to exhaust the system, the food should not be excessive, unless he happens to be an indifferent feeder.

When the work is light, or moderate, a healthy horse will, if left to himself, eat too much.

When cold weather sets in, more food, and that of a more nourishing kind, will be required, than when the weather is warm.

A horse in good working order, and not too fat, requires less food than when in low condition, or when even approaching towards it.

Young horses, when growing, require more food than when arrived at maturity.

Very old horses require food not only more nourishing, but in a more macerated and digestible form than young or matured animals do.

Irritable or nervous horses require more food to keep them in condition than others of a quieter or more lethargic disposition,

Small-bellied narrow-chested horses require more food than deep, round carcassed ones.

Lame or diseased animals, or those with tendency to grease, or corns, or running thrush, or any cause of irritation to the system, require more and better food.

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CHAPTER IV.

BREEDS OF HORSES.

It is not easy, nor perhaps possible, to determine which breed of horse was the original stock. Neither will the oldest evidence—the fossil bones to which we have referred—assist us in the investigation; the internal characteristics being so much alike in the several varieties, and the sizes of different individuals of the same variety being so different. The bones found in England differ in some respects from any horse inhabiting the island at the present time, while the bones found in America seem to be those of a variety now extinct—certainly different from those of the wild race—the emancipated Spanish jennet!

Had the horse, then, several originals? Was he similar to or different from those now known? Whether the breeds of our domesticated animals originated from one pair or from several, is a curious subject of investigation! Was there originally a domestic as well as a wild species of the horse, created, as it has been hinted, in connection with others of our domesticated animals? Again, can the high-mettled racer, the Arabian and the Suffolk punch, the diminutive shelty and the stately Clydesdale, the London dray-horse and the light, clean-legged Cleveland coach-horse, have been all from one common stock? The question has baffled naturalists and philosophers. Either the negative or the affirmative of the proposition is open to objections. Meanwhile, the fact remains unsettled, and will probably remain so. Climate converts hair into down, wool into fur. There is a plasticity in nature—a tendency in all animals to accommodate themselves to the circumstances in which they are placed—which, though slow sometimes, and sometimes painful, is, perhaps, the most wonderful, if investigated with patience, of all the characteristics of nature. What but this power of adaptation gives the curly, shaggy coat, to the animals which inhabit the northern Highland glens, as being the best calculated to defend them from the wintry blast?

Then, again, mark the effects of herbage and food. Take two twin foals, where the mother has only milk for one; give the one its natural food—the mother's milk—and feed the other one on cow's milk, and sugar also, if you like. The one nursed by the mother will be a thriving animal; the other meagre and shrunk. This is the effect of aliment. In the one instance, the food was that appointed by nature; in the other, it had none of the food calculated to develope its qualities; and it shows its wants, not by dying, but by assuming an altered and perhaps deteriorated form. Now, take these same twins—leave the one nursed and fed by the mother in the fertile valley of the Clyde, and drive the other to browse on some heath-covered Highland hill. The one draws its food from an alluvial soil,—the deposited debris of many generations;—it luxuriates in the grass grown over what was once the bed of a wide-flowing river, filled up with the finest and most soluble particles of earth, washed out of the virgin soil, and mixed with the phosphated earth, the washings of the mountain limestone and granite. In this fertile valley our foal, now a colt, has food easily attainable. He rests and he sleeps. His food is abundant in ammonia and potash to form flesh, and in phosphate for forming bone; he lives richly and easily, has acquired large bones, powerful muscles, and broad and rigid sinews; and he increases in size and bulk. United with others similarly fed and developed, he becomes in time the powerful and majestic Clydesdale horse.

The other has to pick up a scanty subsistence on barren moors; he has to travel far for his necessary food, roaming all day from hill to hill; and the grass he finds is poor and innutritious. On this fare, however, he becomes active and hardy, although his frame is small and stunted, for he only attains half his growth. Breeding with animals like himself, denizens of the same moor, they increase in hardiness; and a breed of horses, small-boned, muscular, diminutive, and shaggy, is established, just the converse of the lordly Clydesdale—the one the Lilliputians, the other the Brobdignagians of their race! Such is, in all probability, the origin of the numerous varieties of the horse, now spread over every part of the known world. The wild Tartar horse is probably the original of the breed, the type untamed—unchanged by civilization—of all the breeds now existing, spreading, perhaps, over a greater area than any other race of animals. To habit, soil, climate, and to the hereditary domestication of centuries, are we to trace the different varieties, all fitted by the plastic hand of nature for the purposes for which they are required, and all more or less adapted to minister to the wants of man.

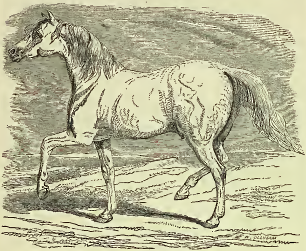
We have seen that in Egypt the horse was in general use in the very earliest stages of the world. We also find that in comparatively modern times—so recent as the days of Mahomet, when he attacked the Koreish—it is stated that not a single horse was to be found in the entire camp of the Prophet—showing how scarce, even at so recent a period, were horses in Arabia. There is, of course, no question that Arabia subsequently became a great depot for the horse, and that the animal attained a great degree of perfection in that country; for, in point of fact, it is to the introduction of Arabian blood that the horses of the British Islands owe their present undisputed superiority over those of all other countries.

In pursuing this investigation, it is not our intention to devote much space to the details of the natural history of the horse, partly because the practical portion of the subject is sufficiently extensive to require all our space to do it justice, but more especially because that animal occupies a prominent place in all books on the natural history of animals. Confining our remarks, therefore, to a brief view of the principal stocks at present known (which is the more necessary, as the different varieties present different modifications of form, of disposition, constitution, and adaptation), we shall commence by giving a short history of the Arabian horse, from which all our best blood is descended; and then, before entering on the English breeds, follow up our sketch by a short account of all the foreign varieties of the horse.

CHAPTER V.

ARABIAN AND OTHER FOREIGN BREEDS OF HORSES.

In Arabia some horses run wild, and even in that feral and uncultivated state are creatures of considerable beauty of form, and endowed with the greatest mildness and generosity of disposition. In size these animals are small, averaging between thirteen and fourteen hands high. Their colour is usually a dappled grey, but sometimes a dark brown, with short and black mane and tail. They are caught in snares carefully concealed in the sand, by which means the feet becoming entangled, the terrified horse falls to the ground, and is easily captured. This is the only mode by which they can be taken, their swiftness rendering all idea of chasing them with dogs, or on horseback, utterly out of the question. These wild Arabs are now nearly extinct, the high price given for them having induced the natives to draw largely and constantly upon these resources of the desert. To the wandering Arab the horse is of the greatest value. The poorest Bedouin has his domesticated steed, which shares with him and his wife and children the shelter of his humble tent, his caresses, and his scanty fare. Oft may the traveller in the desert behold, on entering within the folds of a tent, the interesting spectacle of a magnificent animal, usually a mare, extended upon the ground, and some half dozen dark-skinned, naked urchins, scrambling across her body, or reclining in sleep, some upon her neck, some on her carcass, and others pillowed upon her heels. Nor do the children ever experience injury from their gentle playmate. She recognizes them as the family of her friend, her patron; and towards them all the natural sweetness of her disposition leans, even to overflowing. The Arabs invariably keep *mares* in preference to *horses*. They find them better endure fatigue and the privations necessarily consequent upon a journey over the desert. A number of them can also be kept together without danger of their quarrelling or injuring each other. On this account it is very difficult to induce an Arab to sell his mare. The Arab is particularly careful of his horse's *coat*. He washes the legs, tail, and nostrils, regularly, morning and evening, and always after a long ride. The mane and tail are left in their natural state, and very seldom even combed, lest they might be thinned. The animals are fed only during the night; and from morning to evening they get nothing but one or two draughts of water. From sunrise to sunset they are kept, standing at the door of the tent, ready saddled; or if allowed to stray saddled, they speedily come on the call of their master.


THE ARABIAN HORSE.

The Arabs carefully preserve the pedigree of their horses, and divide them into classes, or castes. The most noble of these can, say their traditions, be traced back to the steeds on which Mahomet and his companions rode on the night of the memorable "Hegira." The truth is, that the celebrated *Kochlaini* breed are so excellent and so valuable, that the Arabs have fanatically attributed its quality to their being the descendants of the prophet's horse. Some traditions even carry its origin back to the days of Solomon, from which time they are said to have descended without cross. The mare is, as we have stated, almost unpurchasable; there being a law indeed prohibiting her exportation; and the horse is only to be obtained at the most enormous prices—one thousand pounds not being an extraordinary sum, and instances being on record of mares having been purchased for double that amount. We give a brief description of the appearance of the pure Arabian, as found in a domesticated state, and this is the more necessary, as many spurious Arabs are frequently endeavoured to be palmed upon the unwary or inexperienced. In the preceding page is given a portrait of the celebrated Wellesley Arabian.

The thorough-bred Arab never exceeds fifteen hands, and rarely fourteen hands and a half in height. The *skin* is pure black, or blue-black, a circumstance which gives to a white horse of this breed that beautiful silvery grey colour, so indicative of the purest blood. Brown, bay, and chestnut, are good colours; but it has long been remarked in India, that *no dark-grey horse* was ever a winner upon the turf.

The head of the pure Arab is light, clean made, wide between the nostrils, broad in the forehead, short and fine in the muzzle, and remarkably small in the lower jaw; nostrils expanded and transparent; eyes prominent and sparkling; ears small and neatly set on; neck rather short and very wide near the throat; shoulder high and well thrown back, the shoulder-blade inclining backwards nearly forty-five degrees; withers high and arched; legs fine, flat, and small-boned; body somewhat light, but showing substance wherever it is really wanting; the chest, for instance, has frequently been objected to as being too confined; but a less cursory examination will discover, that although apparently narrow, at a front view, it swells out behind the *arm* to a remarkable degree, thus affording ample room for the play of the lungs. The hind quarters are set on somewhat obliquely; but from the extreme density and hardness of the bone, and lightness of form which enables it to endure the additional strain thus induced, this formation, far from detracting from the animal's strength, has rather a contrary effect; and to this peculiarity of conformation are mainly attributable the extraordinary speed and powers of endurance possessed by the Arabian horse. These qualities have stamped it as the source of improvement in all our British breeds; so that no very swift horse can be named which does not, on one side or the other, trace its descent from pure Arab blood. As a racer, on a regular course, the

Arab has seldom been afforded a fair opportunity of competing with our own blood-horses. Such as have been thus tried have always been animals of an inferior stamp, and their invariable defeat has been the natural consequence.

The Bedouin Arab—the wildest son of the desert—is possessed of the most perfect of the Arabian caste, or *Kochlaini* breed of horses; and the purity of these is kept with all the care of a crown jewel. The feats these can perform are so wonderful, as almost to exceed credibility. In the poetical language of the desert, "If you meet one of the faithful mounted on a *Kochlaini*, and he shall say, 'God bless you,' before you can reply, 'and God's blessing upon you,' he shall be out of your horizon; for the whirlwind travels after him in vain." Fifty miles on the arid sands of the desert per day, is not considered too long a journey without a halt; and even more than double that distance is sometimes accomplished. They are taught to drink as little as possible, used to endure long without food, and possess that power of endurance so far, as sometimes to be from twenty-four to thirty-six hours—and even a greater period—without tasting either of food or drink.

Though the Arabian horse is the companion of his master—partakes of his fortunes, his privations, his joys, and his sorrows, and is treated as one of his own children, the test of its powers of endurance are for once in its life of a very severe and almost cruel kind. She—for, as we have seen, female animals are the great favourites—is mounted for the first time as a filly, and forced over fifty or sixty miles of desert at the very top of her speed. She is then plunged into water up to her middle, and if she endures this, and appears not to suffer, she has established her character. And perhaps this has more to do by far with the proof of her value than pedigree or descent. It taxes her powers of endurance to their extreme tension; but if she is feeble or inferior this will break her down—she is rejected from the superior caste, and only those are bred from her for keeping who can endure the ordeal. It is probably this treatment, rather than any striking peculiarity of breed, which establishes and draws out the powers of endurance of the Arabian breed of horses. But Bingly says: "In this wild and thinly-populated country, the very existence of the owner sometimes depends upon the powers of his horse, and consequently the most innate attention is paid to purity of breed. It is chiefly in consequence of this, that the race is able to sustain infinitely greater fatigue and abstinence than the horses of any other country. A horse in that country, which cannot support itself for three days under continued bodily exertion, is accounted of little value." More credit, therefore, is due to the actual hardiness and powers of endurance, than to any pedigree. These are never kept by the Bedouins, and only made when the horses are intended for sale.

THE PERSIAN HORSE, in general appearance, somewhat resembles the Arab, and though in most respects less esteemed than that animal, he is in other points his superior. This horse stands somewhat taller than the Arab, is full of bone, and very fast. That peculiarity, "ewe-neck," so indicative of high breeding, is very common. Like the Arab, these horses are fed, cleaned, and watered only at sunrise and sunset. Their food is coarse and scanty. Hay is unknown as a horse-diet in Persia, the usual food being barley and chopped straw, which, when the horse is picketed, is put into a nose-bag; but, when fed in a stable, it is put into a lozenge-shaped hole, left for that purpose in the mud-built wall, much higher up, however, than our mangers usually are. His sole bedding consists of his dung, which becomes pulverized by the day's sun, and at night is spread out under him. His body, however, being invariably covered with clothing, varied in quality according to the season, never touches this bedding, which therefore can benefit the horse only by its softness. Sir R. K. Porter, in his Travels in Persia, has drawn a graphic picture of the mode in which the Persian horses are stabled at night, and of the uproarious scenes of combat and confusion which sometimes take place among them. After describing how several entire horses are tied in one place, he says—"Their keepers always sleep on their rugs amongst them, to prevent accident; but, notwithstanding all this care, they manage sometimes to break loose, and then the combat ensues. A general neighing, screaming, kicking, and snorting, soon rouse the grooms, and the scene for a while is terrible. Indeed, no one can conceive the sudden uproar of such a moment who has not been in eastern countries to hear it; and then, all who have will bear me witness that the noise is tremendous. They seize, bite, and kick each other with the most determined fury; and frequently they cannot be separated before their heads and haunches stream with blood." This fury and pugnacity is not wonderful in a breed of animals once the great war-horses of the East; neither, indeed, would the scene differ much were as many English stallions to get loose. Who has not seen the consternation caused at a country fair by the snorting and the fury of one which had unhappily escaped from his leader!

THE TARTARIAN HORSE resembles the Persian in his swiftness; but there, to a considerable extent, the resemblance ceases. These horses are heavy-headed, very low in the shoulder, awkwardly made, and altogether ill-looking brutes. In the wilds of Tartary, however, there are still some of the original breed to be met with, to which we have before alluded, that are yet ignorant of the spur, upon whose neck bridle has never yet hung, and whose forms would almost give the lie to our description. In Tartaria Minor, or Little Tartary, the natives possess a breed so highly esteemed, that they have entered into a compact not to sell any of them to strangers or foreigners.

Perhaps an account of the wild Tartarian horse will not be uninteresting; though Youatt will not admit them to be the original wild horse, but merely individuals which have escaped, associated, and bred together, and thus become utterly untamable and *uncivilized*. Still they have every symptom of the naturally wild animal. Like the wild cattle of Chillingham (of which an account is given in Milburn's Treatise on the Cow, in this series of Handbooks), the mares seem to choose from the herd the strongest male as a leader,* who remains the sire so long as he is the most powerful of the stud. On being attacked, the mares and foals are placed in the rear of the herd, and the young stallions form the van, headed by this their captain. Nay, what more fully indicates their untamed natures, they immediately fall upon and destroy every domesticated horse which falls in their way, as if to revenge themselves of his unworthy servility.

These wild horses are hunted, mainly for food, by the Tartars, who live on horse-flesh to a very considerable extent; and they follow the sport in a very remarkable manner. Horses and dogs would be quite useless to secure them; and accordingly they adopt the more antiquated mode of *hawking*. For this purpose a species of *vulture* is trained to seize upon one of these equine animals; when, securing its talons on the head, and fluttering its wings, the horse becomes so frightened and confounded that he is easily taken, and either bound or destroyed.

These animals are difficult to tame, and require to be taken quite young to be of any use. Youatt traces these wild races to the cavalry horses disbanded for want of forage at the siege of Azof, in 1657; but we are inclined to follow Humboldt and Pallas in considering that at least one original breed belongs to Crim-Tartary.

The Tartars eat the flesh of their horses, and use the milk of the mare, from which they also make excellent cheese. From mares' milk the Bashkirs make a kind of wine, called "*Kumiss*," the nutritious properties of which are said to be of a very high order, and it is also decidedly stimulative. An anecdote is related of a certain nobleman who laboured under a complication of chronic disorders. By the direction of his physician, he travelled to Tartary for the sole purpose of trying the effect of this liquor. At starting he was so weak that it was necessary to lift him into his carriage. After a sojourn of six weeks only in Tartary, he returned home perfectly cured, and so fresh and plump that his most intimate friends were at first sight unable to recognize him.

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* This leader is a great object of ambition to the Tartars, whose greatest triumph is to capture him.

THE TURKOMAN HORSE is a variety of the Tartar, but of superior qualities. It is held in high estimation, and will, even in Persia, frequently fetch so high a price as from one to two hundred pounds. The average height of these horses is fifteen hands, and, in their general shape and appearance, they bear no distant resemblance to a well-bred English carriage-horse. They are possessed of very considerable speed, but are not *enduring*, being *too small in the barrel*, and too leggy. This breed is occasionally palmed off on English speculators, by crafty Asiatics, as the true Arabian breed. The Turkish Horse is of slender make, carries his head high, is full of life and fire, and possesses a most docile and affectionate disposition. In his form and character he demonstrates his descent, a cross between the Persian and Arabian, or perhaps the Barb. The Turkish horses have long been celebrated for their docility and gentleness, and they are treated with the utmost kindness by their masters and grooms.

As an instance of the extreme partiality with which the Turks regard their horses, the following anecdote may not be out of place:—Theophilactus, Patriarch of Constantinople, was so passionately fond of horses, that he kept two thousand of his own, fed every day chiefly on saffron and pistachio nuts. One Holy Thursday, while he was officiating pontifically in the church at Constantinople, word was brought him that a favourite Arabian mare had foaled. He immediately left the service, ran to his stables, and did not return to finish the sacred ceremonies until he had given the necessary orders for the treatment of both mare and foal.

The tail of the horse is in Turkey regarded as a mark of dignity, and is, both in that country and in Persia, employed as an emblem of station, princes measuring their rank by the number of tails they carry. The origin of this custom is as follows:—The Turkish army at one time lost its standard in a battle, and a gallant leader, in order to inspire the faltering spirits of his men, cut off the tail from a slain charger, and hoisting it aloft on the point of a javelin, rallied his soldiers, once again brought them to the charge, and gained a victory over the enemy. From this he received a corresponding military distinction, whence originated "Pachas of Tails." Those of the highest ranks are invested with *three* tails. The Grand Vizier is always preceded by standards formed of horse-tails, each surmounted by a gilded ball.

THE HINDOSTANEE HORSE.—The climate of India does not appear to be congenial to the constitution of the horse, and that animal is invariably found to degenerate, unless the breed be, from time to time, carefully regenerated and sustained by judicious crossing. The most *genuine* native breed, or, in other words, that which has been least affected by *improvement*, is called the "*Tazee.*"

The Tazee, as ordinarily known, is a small, ill-made, and ugly beast, equally deficient in spirit and in form. This is not, however, the character of the original race, which is accurately described by Colonel Hamilton Smith as a bold, spirited, and handsome animal, and so fiery as to require a bold rider. Of this race are the "Serissahs" of the North Bahar, of which upwards of twenty thousand are sold at the annual fairs. Between the Tazee and the Persian a mixed race is bred, called in India the Maginnie.

So unsatisfactory were the most improved breeds of Hindostanee horses, that the East India Company felt it absolutely necessary to import European science and skill to improve them. They selected Mr. Moorcroft, a veterinary surgeon of some eminence, for that purpose. He much improved their health by introducing oat diet instead of the grain of the country. He urged the adoption either of the Turkoman or the English horse, as the best means of improving the native breed, in preference to the Arab. The purpose was, however, abandoned; and in an expedition to Bokhara, in search of a stud of horses, he perished, it is said, by poison. Hence his plans were not carried out.

Australia has now the almost exclusive supply of horses for our Indian armies. The horses of these regions being strong, hardy, and enduring, they are consequently well adapted for that purpose. There are several other Hindoo breeds; but as it is a matter of notoriety that not one remains the same for three generations, being constantly crossed and re-crossed, it appears unnecessary to enumerate them. We may, however, just name a few of the best known:—

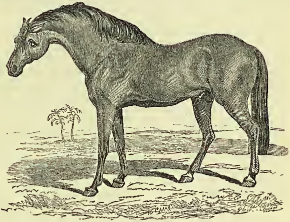
The *Takan* is a strong and powerful animal; a natural ambler, and hence in much esteem for the use of ladies.

The *Folaree* breed is a variety of Takan; tall, but spiritless.

The *Cutch* is remarkable for the suddenness with which the withers drop, as if a portion of the vertical ridge of the spine had been cut away; hence it is difficult to fit with a saddle.

The *Dattywarr* is superior in blood to any of the preceding; usually dun-coloured, and striped like a zebra. When thus marked, it competes in value with the Arabian.

The African Horse.—Of this race of horses the principal is that known under the name of Barb. This horse exceeds the Arabian in stature, and is remarkable for the height and fulness of his shoulders, drooping of the haunches, and roundness of the barrel. The Barb does not fetch so high a price in his own country as the Arab; and hence he is frequently imported, and fraudulently passed off on purchasers as that animal. Above is a portrait of that remarkable horse, the Godolphin Barb, sometimes erroneously called the Godolphin Arabian.



THE GODOLPHIN BARB.

Amongst the most excellent of the African varieties of horse may be named the celebrated "Shrubat-ul-reech," or "Drinkers of the wind," in possession of the Maugrabin tribes, shaped like greyhounds, wiry and fleshless. Mr. Davidson relates that one of these performed a journey of sixty miles, under a burning sun, at the hottest period of an African day, without the rider once drawing bridle. The Arabs ride *mares* only, for they chiefly rely on stealing unawares upon their foes. The Africans rely on force alone, and consequently ride the *horse*, on account of his superior power. Were the Arabs to ride horses, the moment they came within *scent* of the hostile camp, their steeds would betray everything by their neighing.

Towards the central parts of Africa we find the Bornou race of horses extolled by Mr. Sully as possessed of the qualities of the Arabian, with the beauty of the Barb; "they are," he says, "fine in shoulder, and of general elegance of form." The horses of Nubia are stated by the celebrated traveller, Bruce, to be far superior to the Arabian. The natives trace their pedigrees from five stocks, all horses ridden by Mahomet and his four companions, Abubeker, Omar, Osman, and Ali, when in their flight to Mecca, since designated "Al Hegira."

The little kingdom of Dongola, or Donkala, possesses a remarkable breed of horses of a large size, their chief characteristics being great shortness of body, length of neck, height of crest, and a beautiful forehand. Bosman pronounces them to be "the most beautiful in the world." These horses have been imported into our islands; but their progeny, perhaps for want of judgment in the selection of their mates, have never in any instance turned out favourable.

Nothing can exceed the carelessness of the inhabitants of the western coast of Africa as regards their most valuable animals. Duncan, the African traveller, who rode on horseback ankle-deep in dry sand, with the thermometer at 118°, through the burning plains of Africa, says:—"The Africans pay no attention neither to domestic or wild animals. Even the dog or the horse, the two most sagacious of all the animal creation, excite in them no interest whatever. If not driven to it, they will suffer a horse to stand for days tied up, without food or water." Their horsemanship seems on a par with their care of the animals. The King of Dahomey sent two men to hold Mr. Duncan upon his horse, when the latter was showing to his Majesty the evolutions of English cavalry!

Of the horses of Egypt Proper it is unnecessary to say much. Egypt, at one time the mart from which came the 40,000 horses of Solomon, has long lost its character as a breeding country, and its horses are deservedly held as much inferior to those of either Persia, Barbary, or Arabia. Though heavy and ill-formed, having generally bad legs, and unable to endure much fatigue, they have great impetuosity, and so far retain the war-character they had in the days of the Pharoahs. Buckhardt describes them as "ugly, of coarse shape, and looking more like a cart-horse than a racer. Thin legs and knees, and short and thick necks, are frequent defects among them." How different from the Arabian! with his muscular arms, his arched neck, and his fine and elegant head; and yet, when the horses of Egypt were in their glory, the Arabians were unknown. So much may be lost by the neglect of cultivation in a race of animals of acknowledged supereminence. What they were, in docility at all events, some centuries ago, it may be interesting to learn, and we accordingly insert the following description from the pen of the well-known Baumgusten, who was a witness of the scene which he describes :—

"In the year 1507 the Sultan of Egypt made ostentation of his magnificence to the Turkish ambassador. There were sixty thousand Mamelukes, in the same uniform, assembled in a spacious plain, in which there were three heaps of sand, fifty paces distant, in each a spear erected, with a mark to shoot at, and the like over opposite them, with space betwixt, sufficient for six horses to run abreast. Here the youngest Mamelukes, upon their horses, running at full speed, gave wonderful proofs of their skill. Some shot arrows backward and forward; others, in the midst of their race, alighted three times, and, their horses still running, remounted, and hit the mark nevertheless; others hit the same standing upon their horses then running; others three times unbent their bows, and thrice again bent them, whilst their horses galloped, and did not miss the mark; neither did others, who in the middle of their race, alighted down on either side and again mounted; nor they who in their swiftest course leaped, and turned themselves backwards on their horses, and then, their horses still running, turned themselves forward. There were some who, while their horses galloped, ungirt them thrice, each time shooting, then again girting their saddles, and yet never missed the mark; some sat in their saddles, leaped backwards out of them, and, turning over their heads, settled themselves again in their seats, and shot, as the former, three times; others laid themselves backward on their running horses, and taking their tails, put them in their mouths, and yet took an undeviating aim in shooting; some, after every shot, drew out their swords and flourished them about their heads, and again sheathed them; others sat between three swords on their right and as many on their left, thinly clothed, so that without great care every motion would wound them; yet before and behind them, touched the mark. One stood upon two horses running very swiftly, his feet loose, and shot also at once three arrows before, and again three behind him; another sitting on a horse, neither bridled nor saddled, as he came at every mark, arose and stood upon his feet, and on both hands hitting the mark, sat down again three times; a third, sitting on the bare horse, when he came to the mark, lay upon his back and lifted up his leg, and yet missed not his shot. One of them was killed by a fall, and two much wounded in these feats of activity."

Designing to leave the horses of our own country to the last, as they will demand our more particular consideration, we now turn to those of AMERICA.

In parts of the southern portion of this vast continent, extending from the shores of the La Plata to Patagonia, are still to be met with innumerable herds of wild horses; and many such are also to be found about the back settlements of its northern portion; both, however, evidently the descendants of domestic horses, that accidental causes have driven to a feral condition. These herds appear to act in admirable concert, and by their united force defy the attacks of the various ferocious animals who share with them the possession of the wilderness. Nor are they formidable only to those equally savage denizens of the prairie; the traveller, if incautious in approaching them, will too dearly rue his temerity or ignorance, and a meeting with such a herd of untamed coursers has often proved to be anything but desirable. When a traveller with laden horses encounters one of these wild herds, even should he personally escape attack, his horses, if they can by any means shake off their burdens, will break away, and join their fortunes with those of their emancipated brethren. When it is deemed desirable to capture these horses, the natives employ a long leathern noose called the *lasso.*

Few wild sports require more skill, or cause more excitement, than catching and breaking those wild animals of the prairie; nor has any one more graphically described it than Captain Basil Hall. The horses which are considered domesticated are kept in inclosures of high posts driven into the ground; but the agility and tact displayed by the wild-horse hunters is beyond all calculation. A herd of horses is driven by a large party of hunters into one of these inclosed grounds, or corals, when the hunter, mounted on horseback, contrives to throw a noose over the head of some selected animal. A young animal is generally chosen, and he is thus dragged out of the inclosure, and immediately secured by various bandages, until a most daring breaker, trainer, or hunter, as he may be properly called, mounts his back, and sets off with the rapidity of lightning. Away the horse gallops,—a halter of thong in his mouth for a bit, a saddle tightly girthed on, and a rider—rough-rider he is indeed—well spurred, goading on the affrighted animal, until, from sheer exhaustion, it stops. He brings it back subdued to the inclosure. Its mane and tail are shaved or clipped, and he becomes a willing slave for ever afterwards.

Sometimes, however, the horse turns stupid. He stands fixed and immoveable, or even rolls, kicks, and paws. These are the most dangerous and difficult to manage; but the skill and agility of the trained breakers, the strength of their thongs, composed of platted skins, and the potency of their spurs are uniformly crowned with victory.

A gentleman, who has given his experience of South American horses, in the *Veterinarian*, says, "They are generally smaller than the English horse, and have a very heavy appearance, approaching to something like the dray horse used with us. They are bony, and universally possess a broad chest—a property highly esteemed by the Chillians. I consider them somewhat vicious; though the 'guasos,' or breakers above referred to, pride themselves on being good trainers. They have a custom of training all first-rate horses to jump off at the time of mounting, and with persons unaccustomed to this, accidents often occur, to which I have on many occasions been eye-witness. They are very tender-mouthed, from the very severe bit used in the country, so much so that a horse at the height of his speed can be checked with a little finger. It is a most beautiful sight to see the quickness with which they obey the reins, the slightest check of which brings them completely on their haunches. They never commence training them till four years of age and upwards, and to this I attribute their lasting qualities."—They never take the *mares*, nor even ride them; and it is related of an Englishman, attempting once to do so in that country, being hooted and pelted by the natives to such an extent as narrowly to escape with life. The horses of North America are somewhat more hardy, more inured to slavery, and are much valued by the Indian natives, who use them in hunting, in war, and in travel. The acquisition of the horse must have proved a great boon to the wandering savage, and he is recognized as such, to so great an extent, indeed, that stealing the horses of a hostile tribe is conceived to be as heroic an action as the taking of their masters' scalps.

The horses of the *Canadas* are, as might be expected, principally of French descent; and from this stock have sprung many of the celebrated American "trotting phenomena." The horses of the United States are crossed with a great variety of breeds, amongst which the

English is predominant; for, with all Brother Jonathan's good opinion of himself, he is, to a great extent, still impressed with the superiority of articles coming from the "old country;" and perhaps he is not so very far astray in his idea. The Americans are now exerting themselves strenuously for the improvement of their horses. Amongst other efforts we are not to overlook the establishment of agricultural shows in various states, particularly in the southern ones; and in these exhibitions the customs common to those of Britain have been generally adopted.

The horses of the West Indian Islands naturally present themselves to our notice in connexion with those of America. They are chiefly the breeds of the states to which each island more particularly belongs. The horses of Cuba, especially, betray, in a manner too apparent for any mistake, their Spanish origin; and those of the British colonies, on the other hand, present marked evidence of owing much of their blood to the mother country.

The Americans have, from time to time, imported first-rate English blood for the improvement of their stock, and the progeny of many horses of celebrity is yet to be met with in many portions of the States, especially Virginia, Kentucky, and the Jerseys. Amongst these were, recently, "Shark,"—a horse seldom equalled, and decidedly the star of his day—and "Tallyho," the son of "Highflier," to whom the horses of the last-named state owe the best portion of their blood. The American travelling horse must not be overlooked in this brief sketch of the foreign breeds.

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CHAPTER VI.

HISTORY OF THE BRITISH HORSE.

The subject which will probably possess more interest for the reader than any of the preceding chapters, is the history of the horse in the British Islands, and his progression, alteration, and improvement, from the earliest periods of which any authentic records remain, up to the present time.

The first mention that we meet with of the history of the horses of these islands, is the era of the invasion of England by the Romans, under the command of Julius Cæsar; and they are mentioned by him in his "Commentaries" in laudatory terms, speaking highly, at the same time, of the skill displayed by those who managed them. These observations prove that the horse must have been long familiar to the natives of Great Britain. When in a state of barbarism almost amounting to that of the savage, they had acquired a perfect mastery over the animal. At this time, too, it would appear that the Britons had acquired the use of gorgeous ornamental housings and military trappings. Here, however, we find ourselves at fault, and are unable to form even a ramote guess at the source whence our ancestors derived this valuable animal, or to point out any modern variety of horse as having sprung from, or as retaining any resemblance to, the primitive stock. Some have referred to the rough and diminutive shelties of Scotland, to the *hobbies* of Ireland, or to the mountain ponies of Wales and Cornwall; but if there is any truth in this, these animals must have greatly altered in form and stature; for however well, as Pennant justly observes, "they may answer the purposes of these countries, they could never have been equal to the work of war."

We conceive the opinion of the late Mr. Youatt to approach the truth more nearly than any with which we have met. He conceives the horse to be "then, as ever, the creature of the country in which he lives. With short fare, and exposed to the rigour of the seasons, he was probably the little hardy thing which we yet see him; but in the marshes of the Nen and the Witham, and on the borders of the Tees and the Clyde, there would be as much proportionate development of frame and strength as we find at the present day."

It is certain that the horses of Britain, in the time of Cæsar, were powerful and active; for the war-chariots were of a heavy and clumsy construction, the roads unformed, and only passable by the exercise of extraordinary power. That these animals were valuable, we learn from the fact that Cæsar carried back several to Rome; and that they were, for a considerable time afterwards, in much esteem throughout various parts of the Roman empire.

Of the numbers of this animal then kept in Britain we may form some idea from the circumstance that the British king, Cassivellaunus, in disbanding the main portion of his army, *retained* four thousand horses, for the purposes of foraging, and for harassing the Romans.

About this period the Romans, finding it necessary to employ active measures in order to maintain a secure position in the country they had just conquered, deemed it advisable to garrison it strongly; and consequently, acting on this resolution, they sent into Britain a considerable force, amongst which was a powerful body of cavalry.

This of course gave rise to a union of the foreign breeds with those of the country into which they were introduced; and this was, in all probability, the first cross to which our British horses had been subjected. Nor was this cross to be regarded merely as one with the *Roman* horse. That powerful nation had already established intimate relations with their various neighbours; and horses from many different portions of the then known world must have formed the component parts of the Roman cavalry. Whether any *improvement* in our British horses is to be attributed to the Roman conquest is, however, questionable. The Roman cavalry could never have been very respectable, when a deformity, in the case of Cæsar's own horse, which seems to have possessed some elongation of the hooves of the fore feet, was made a subject of rapturous applause, and was deemed such a perfection as to call for the tribute of a public statue. Nor were the Romans, at this period, by any means the equal of the Greeks in the art of war, or in the appliances they were able to bring into the field of battle. That the horses of Greece were at this time superior to those of Britain, is just possible; but we may well doubt the fact; and in reference to the Romans I think we may discard doubt altogether. The Anglo-Saxon conquest, doubtless, introduced a variety of other breeds of horses into England, some of which, especially the Frisonic and Danish, were animals of no inconsiderable beauty and stature, and consequently well calculated to improve our native race.

From the period of the Roman invasion we do not find any mention of the horse in Britain until the year 631, when we find the use of the *saddle* mentioned by the Venerable Bede, who states that prelates and other dignified persons, who had, until then, been obliged to go on foot, now rode on horseback. He further states that the dignitaries of the church used the *mare*, and not the *horse*, as a mark of their humility.

King Alfred, of learned and pious memory, the hero of many a tale of valour and romance, exerted himself in the laudable work of improving the indigenous breeds of horses; and that these intentions should be the better carried out, an office was created for the occasion, and the officer received the name of *Horsethane*, which answers to our modern "Master of the Horse. Athelstane, grandson of Alfred, who reigned 980 years after the landing of the Romans, devoted much attention to the subject of improvement; and so jealous was he of neighbouring nations profiting by his exertions, that he prohibited strictly the exportation of horses, unless designed as presents. These enactments furnish the inference, that our horses were then valuable, and that their value was duly appreciated by foreigners.

Although Athelstane did not choose that foreigners should improve their horses by his means, he appears to have bad no objection to avail himself of whatever advantages they possessed in this respect; for we hear of him accepting a present from Hugh Le Grand, King of France, father of the celebrated Hugh Capet, and the then suitor of his sister, Ethilda, daughter of Edward. Athelstane valued these and other presents of foreign horses highly; and in his will he made a careful testamentary disposition of them, particularizing the several presents, as "those given him by Thurlbrand, together with the white horses given him by Liefbrand." These persons were *Saxons*, and therefore it is probable that they were Saxon horses; but, besides these, we find it related that "sundry princes sought his alliance and friendship, and sent him rich presents, precious stones, perfumes, and the *finest horses*, with *golden furniture*." The horses sent this monarch by the French king are stated to have been "*German running horses*."

Athelstane reigned about A.D. 930, and we find, in a document bearing date A.D. 1000 (quoted by Captain Brown, as also by Mr. Youatt), a curious account of the value of horses in those days. If a horse were destroyed, or lost through negligence, the compensation to which the owner was declared to be legally entitled, was thirty shillings; a mare or colt, twenty shillings; a wild, or untrained mare, sixty pence; a mule, or ass, twelve shillings; an ox, thirty pence; a cow, twenty-four pence; a pig, eightpence; and a MAN, *one pound!*—Howell *dha* (or the good), who lived a short time previous to this, had enacted laws restricting the price of horses, as well as establishing certain regulations relative to this description of traffic, designed to prevent *fraud:* so early had *jockeying* become notorious in horse-dealing.

William the Conqueror brought many horses with him from *Normandy*, and thus contributed, in no small degree, not only to the number of varieties known amongst us, but to the positive improvement of those which we already possessed. It is probable that the horses imported thither by William were not confined to the French varieties alone, but were brought from other countries also; for his own favourite charger, ridden by him at the celebrated and eventful battle of Hastings, was a Spanish horse; and it is the general impression of historians, that to his *cavalry* William was mainly indebted for his success on that memorable occasion. Roger de Boulogne, afterwards created Earl of Shrewsbury by the victor, introduced several Spanish horses into the kingdom, especially into his own estate of Powisland. These are noticed by Giraldus Cambrensis, and their excellent qualities are celebrated in verse by Drayton, the poet. Neither of these parties, however, have favoured us with any description of them calculated to prove intelligible to a modern reader. Beranger, on what authority I know not, describes these horses as having been of a class peculiarly adapted to the "purposes of war and the exhibitions of public assemblies, of which horses are always a very essential and ornamental part; for it is not known that horse-racing was introduced into England at this time."

It may be interesting to our *agricultural readers* to learn that, until a comparatively recent period, we find no record of the horse having been employed to draw the plough, oxen alone being used for that purpose; and we find a law enacted in or about the latter end of the twelfth century, *prohibiting the use of horses in the plough.* This, we think, proves that some change in agricultural matters was even then commencing, especially as we have a piece of tapestry, woven in this reign, of that description known as "Bayeux tapestry," representing a man driving a horse in a *harrow.* This is the earliest notice we have of horses employed in field labour.

In the reign of Henry I., in the year 1121, two fine horses of Arabian or Barbary blood were imported into Britain. One was introduced to the court of Henry of England; the other was presented to the Church of St. Andrews, in Scotland, by King Alexander I. Col. Smith (*Nat. lib.*) expresses it as his opinion, that both these horses were *Barbs*, and procured from Morocco, through the medium of the Jewish dealers. Mr. Youatt says that the pretensions put forth of a breed of modern racing-horses having been derived from this stock, are devoid of foundation. In the reign of Henry II., as appears from a curious and scarce Latin tract, such public exhibitions as tournaments and horse-races had become comparatively common. They are spoken of by Fitzstephen, the monk, in his description of London; and his descriptions are written with an animation that seems little accordant with the gravity of his profession. These exhibitions were then held in *Smithfield*, which appears to have been an extensive horse-mart, the resort of merchants and others. The name of *Smith*-field is a corruption of *smooth* field (*planus campus*). Fitzstephen says—"Without one of the gates of the city is a certain plane, or *smooth*, both in name and situation. Every Friday, except some festival intervene, there is a fine sight of horses brought to be sold. Many come of the city to buy or look on, to wit, earls, barons, knights, and citizens. It is a pleasant thing to behold the horses there, all gay and sleek, moving up and down; some on the amble and some on the trot—which latter pace, although rougher to the rider, is better suited to men who bear arms. There, also, are colts, yet ignorant of the bridle, which prance and bound, and give early signs of spirit and courage; there, also, are managed war-horses, of elegant shape, full of fire, and giving every proof of a generous and noble temper. Horses, also, for the *cart, dray, and plough*, are to be found here."—*Leland's Itinerary*, vol. viii.

The period of the Crusades now followed; and these enthusiastic expeditions were the cause of much diminution in the number of our horses, though possibly of some improvement. Thousands of noble steeds were carried to the East by their infatuated masters, many of whom perished on the field, or, if spared life, were usually so poor as to be scarcely able to defray the expenses attendant upon their own return, far less to bring home their horses. That some valuable horses were at this time brought to England from the East there can, however, be little doubt; and many legendary tales of the Arabian steeds of Richard the Lion-hearted still exist. Among others I may mention an old ballad, which runs:—

> "In this world they hadde no pere,
> Dromedary and destrere,
> Steed, rabyte, ne camele;
> Goeth none so swifte, without fayle."

The king also purchased (1185) fifteen brood-mares, for which he paid the sum of two pounds twelve and sixpence, and subsequently distributed to his tenants at four shillings each—a circumstance indicative at once of the king's desire of improvement, and of the value of money at that time.

Perhaps the only redeeming point, in the character of King John, was the attention he paid to the improvement of our native breed of horses. It is recorded of him, that he imported one hundred choice stallions from *Flanders*—a most important improvement, as being eminently calculated to raise our *agricultural* horses to such a standard of power and vigour as was requisite for field labour and for draught; and, in the same reign, we are told that a private gentleman, named Amphtil Till, possessed a noble breed of horses; but, falling under the displeasure of his capricious prince, he was *imprisoned*, and condemned to pay a fine for ransom—a fine, also, characteristic of the royal passion, viz., *ten horses*, each worth thirty marks, which is equal to about £300 of our present currency. When an almost absolute prince possessed so strong a passion for an individual pursuit, and was so little scrupulous in the means he employed for the gratification of any of his whims, it is not to be wondered at that his personal steed was both numerous and excellent.

The next period, in which we find any particular mention of horses, is about a century afterwards, when Edward II., in the second year of his reign, gave a commission to one Bynde Bonaventure and his brother, for twenty war-horses and twelve draught-horses, to be purchased in Lombardy (*pro viginti dextrariis et duodecim jumentis emendis in partibus Lombardiæ*), requiring all his friends and loving subjects to assist in carrying the commission into effect. John de Trokelow, who wrote the annals of this prince, in 1307, bears strong testimony to his zeal for their improvement.

Edward III. was devotedly attached to tournaments and other similar shows of a military description; hence his warm encouragement of horse-breeding. Among other instances of his zeal in this respect, may be mentioned his purchasing fifty Spanish chargers, at a price of one thousand marks. We also find him indebted to Count Hainault in the sum of twenty-five thousand florins, for horses which he had purchased; and on another occasion we find him sending to France for four *chargers* or great horses (*pro quatuor dextrariis seu magnis equis*). Edward was making preparations at this time for a war with Scotland, and, accordingly, when a German dealer had imported some Flemish horses on speculation, he was only permitted to re-embark them on condition of not taking them to Scotland. Our modern readers will, perhaps, learn with some surprise that all these war-horses (*dextrarii*) were taught to *amble;* and in the account of Edward's disbursements, for the horses he obtained from France, we find one item for *trammels*, for the purpose of *teaching horses to amble.* Indeed the obvious derivation of the word *trammels* is from the Italian *trammenare*, to *wriggle*—a term very expressive of the motion called *ambling*. This prince had also many *running horses*, which were probably used for hunting and racing, being of a lighter and more active form than those called *dextrarii.* The price of a *running horse* was, at that time, £3 6s. 8d. This prince also crossed the heavier with the lighter breeds, and thus produced a noble race of horses for the chase —a pursuit to which he was devotedly attached. It may be added, that it was during this reign that horses were first classified according to their different qualifications and uses.

The mode in which combats were decided in the olden time, by hand to hand conflicts, and under defensive armour, had a strong tendency to keep up the bulk of the horse, and prevent improvement.

This continued until the introduction of the use of gunpowder, which was invented by a monk of Cologne, named Schwartz, about the year 1330. From this period the British breed of horses steadily improved, and became everywhere known and valued. As a matter of course, they speedily became a subject of considerable traffic, and this traffic soon led to frauds on the part of dealers. Hence we find Richard II. enacting certain laws with a view to the prevention of dishonest speculation. In 1386 he issued an edict to regulate the prices of the different descriptions of horses then in use. From this edict, as being principally directed to the counties of Lincoln, Cambridge, and York, we can perceive that they were then the principal breeding districts of England; and it is scarcely necessary to remind our readers that the last-named county continues to the present day so famed for its commerce in horses, as well as for the cunning of its dealers, as to have passed into a proverb. There are few who are not familiar with the expression, "To come Yorkshire over us;" hence, possibly, the phrase, too, of being "too far north," and the appellation of "Yorkshire bites."

The civil wars, which arose at or about this time, by throwing the kingdom into confusion, and setting one portion of the inhabitants against the other, not only checked the improvement of the horse, but caused our breeds to retrograde. Accordingly we find Philip de Comyns speaking in very disparaging terms of the English army with which Edward IV. disembarked in France.

The only notice of a horse during the reign of Richard III., which we have been able to obtain, is, that at that period (A.D. 1483), *post-horses* and *stages* were first established.

Henry VII. encouraged the breeding of valuable horses; and it is related by Polydore Vergil that the English used to keep large herds of them in their pastures and common fields, and that when the harvests were gathered in, the cattle of different owners fed promiscuously together; hence the *horses* had to be emasculated in order to avoid disorder—a practice further rendered necessary, in consequence of an act passed in this reign, that no *entire* horse should be led out into any common pasture. This seems to have given rise to our modern appellation, of *stallion*, or *stalled one* (*equus ad stabulum*), by contraction *stallum*, then *stallion*. The king also prohibited the exportation of stallions, and also of such mares as were under two years old, and over the value of 6s. 8d. By means of this arbitrary edict, the best animals were kept in the kingdom, and only the comparatively worthless permitted to leave it. In vindication of these Acts of Parliament, it may be stated, that at this time the exportation of valuable horses had become excessive; thus unnecessarily enhancing the price of such as remained. Indeed this is recited in the preamble to the Act, but seems strangely overlooked by Colonel Smith, who states the enactments to be *unintelligible.* It should also be added, that these enactments were only aimed at *dealers.* Any person might take out of the country horses of what quality he pleased, provided that he made oath they were *bona fide* for his own use, and not for sale.

Henry VIII. paid particular regard to the raising of a good breed of horses, and did not hesitate about forming stringent laws in order to carry his intentions into effect. Some modern writers have censured this king very severely for these enactments, and have made them an occasion for a general review of the least amiable points of his character. It is not for us to defend Henry VIII. as a *king*, but we cannot avoid defending the very politic enactments which he promulgated, with a view to the improvement of horses in these islands. True, they were arbitrary enough; but those were arbitrary times—times that will not admit of being judged of by comparison with the present. It is well known to all breeders, that in order to produce a large and vigorous progeny, it is essential to select parents, on both sides, of the most desirable form; and when it is wished to raise the general character of the horses of any district or country, there could be no better or more certain plan adopted than prohibiting all *inferior* descriptions for breeding. Such was the course adopted by this king, and a law was accordingly passed, directing that every brood-mare should be, at least, fourteen hands high. So marked was the effect produced by that statute, that Carew, in his *History of Cornwall*, suggests that to this was to be attributed the almost total loss of the small horses, formerly so common in that part of England and in Wales—a loss which Carew regrets, but which has been amply replaced by a race of large and serviceable animals.

There were further enactments passed in this reign, all with an evident view to the attainment of a large and powerful breed. Some of these were very singular in their character. For example:—every archbishop and duke was obliged, under heavy penalties, to keep seven entire horses, each above three years old, and not less than fourteen hands high;—each parson holding a benefice to the value of £100 yearly, or a layman, *whose wife should wear any French hood or bonnet*, was obliged, under the penalty of £20, to keep *one such horse.* The obvious reason of enjoining entire horses to be kept, was for the promotion of breeding; and with a consideration that was hardly to be expected from so peremptory a king, the rich and noble were alone compelled to keep *stallions*, their *keep* being so much more expensive, while the humbler classes might keep such mares and geldings as they thought proper.

It being found that the nature of the pasture in some counties, as Cambridge, Huntingdon, Suffolk, Northampton, Lincoln, and Norfolk, was unsuited to the raising of horses of the required bulk, a statute (Henry VIII., 32, cap. 13) was passed, excepting these counties from the operation of the preceding law, and reducing the required standard to thirteen hands. In the 32nd of Henry VIII. (cap. 13, sect. 9), *infected horses* were also prohibited from being turned into public pastures,—a regulation as sound as it is politic.

It was in this reign that the celebrated meeting of Henry with Francis, King of France—known as The Field of the Cloth of Gold—took place; and on this occasion the English monarch is stated to have done his *devoir* as became a bold and chivalrous knight.

Fitzherbert, a writer on agriculture, in 1548, gives the following as the points of what was then considered a good horse, and which is very interesting, as showing the notions of experience at this period. He says, in his quaint style :—

"A good horse hath fifty-four propertyes; that is to say, two of a man, two of a barson, or a badger, four of a lyon, nine of an oxe, nine of a hare, nine of a foxe, nine of an asse, and ten of a woman. The two propertyes that a horse hath of a man,—to have a proud herte and to bee bolde and hardy. The two propertyes of a barson,—to have a white rose or a ball in the forehead, and to have a white fote. The four propertyes of a lyon,—to have a broade breste, to bee stiffe-docked, to be wylde in countenance, and have foure good legges. The nine propertyes of an oxe,—to bee brode-rybbed, to bee low brawned, to bee shorte pasterned, to have great senews, to bee wyde betwene the challes, to have greate nosethoylles, to bee bygge on the chyn, to bee fatte and well fedde, and to bee spryghte standing. The nine propertyes of a hare,—stiffe-eared, to have greate eyes, rounde eyes, to have a bare head, to have leane knees, to bee wyght on fote, to turn upon a little ground, to have shorte buttockes, and to have two good fylletes. The nine propertyes of a foxe,—to bee pryche-eared, to bee lytell-eared, to bee round-syded, to be syde-tailyed, to bee short-legged, to bee blacke-legged, to bee short-trottynge, to bee well-coloured, and to have a lyttell head. The nine propertyes of an asse,—to bee small-mouthed, to bee longe-rayned, to bee thin-cressed, to bee streyght-backed, to have small stones, to bee lath-legged, to bee round-footed, to bee holow-footed, and to have toughe bone. The ten propertyes of a woman,—to bee mery of chere, to bee well-paced, to have a brode forehead, to have brode buttocks, to bee hard of ward, to bee easeye lape uppon, to bee good at a long journey, to bee alwaie besy with the mouthe, and ever to bee chowying on the brydell. It migght fortune I could showe as many defaultes of horses as here bee good propertyes, but then I should breake my promise that I made Grombolde Brydge, the firste time I wente to Ryppon for to bye coltes. But it is to suppose, that if a horse want any of these good propertyes, that he should have a defaulte in the same place. And this is sufficient for this tyme."

It is a fact, and one much to be regretted, that all King Henry's enactments appear to have fallen short of the mark, and to have produced only temporary and not permanent improvement: for when Queen Elizabeth called out the entire strength of her cavalry to oppose the Spaniards, she could only muster a force of three thousand mounted men-at-arms. That there were still, however, fine horses in the kingdom, cannot be questioned; for Ulysses Aldrovand says that there were so, but principally in possession of the nobles. Some have referred this failure to the tyrannical character of Henry's enactments; but it is far more likely to have been owing to the superiority the British horses rapidly attained during the middle portion of his reign, which caused them to be eagerly purchased, and taken out of the kingdom by foreign grandees for purposes of state—a circumstance much promoted by the introduction into the kingdom, at the time, of *Italian farriers* and *foreign grooms*, who had, of course, the welfare of their native country far more at heart than that of a foreign one.

Edward VI. reigned long enough to introduce one stringent act in favour of the horse. He made horse-stealing a felony, and that *without benefit of clergy* (1 Ed. VI., cap. 12).

Queen Elizabeth was fond of horses, and she was herself a bold and spirited horsewoman, riding to the hounds even at the advanced age of seventy. In the commencement of her reign (8 Elizabeth, cap. 12), she repealed the statutes enacted by her father, as to the standard size of the horses to be kept in certain English counties.

In the twenty-second year of this reign, *coaches* were first introduced, A.D. 1580, by Fitz Allen, Earl of Arundel. Up to that period, the first ladies of the land had no other mode of conveyance than to ride behind a gentleman on the pillion, and even the queen rode thus behind her Master-of-Horse when she went in state to St. Paul's. The introduction of coaches tended much to improve the breed of horses. Up to that period, slow, heavy brutes were preferred; and this may therefore be regarded as one of the most important epochs in the history of the horse in Britain. The use of coaches also gave rise to an increased demand. At length so great was the number of horses thus employed, that a bill was actually introduced into the House of Lords "to restrain the excessive and superfluous use of coaches." The lords, fortunately for the improvement of horses, did not entertain the bill, but desired the attorney-general to inspect the former statutes for the promotion of the breed of horses, and to introduce some other bill in its stead. It is, however, certain that some bill was introduced which had a tendency to revive the old practice of riding on horseback, in preference to being conveyed in coaches; or else that some of the old school still persisted in keeping up antiquated usages; for we find that in the reign of James I. the judges rode on horseback to the courts of law in Westminster Hall.

Gunpowder and its appendages and appliances having now taken the place of heavy armour and the lance, a lighter and more active breed of of horses began to be cultivated; for even when armour continued to be used, it was of a light and partial description. Of the effects of the change upon the character of our horses we can readily judge from the expressions of Sir John Smythe, who wrote in the year after the memorable attempt of the Spanish Armada. He says:—"Their horsemen also serving on horseback with lances, or any other weapon, they think very well armed with some kind of head-piece, a collar, and a deformed, light-bellied beast." Such was the origin of our light and fleet breeds of horses, which became as necessary as the weight of the rider decreased, as were the more heavy and powerful, so long as the ancient ponderous armour continued to be worn. It has been said that some of the Spanish horses escaped from the wreck of the Armada, and were the originals of the breed of galloways in Scotland.

In Elizabeth's reign, tournaments continued in high repute; and in that of James I. of England and VI. of Scotland, every description of horsemanship received, if possible, still greater encouragement. Horse-racing now became extensively cultivated and promoted. This prince had established this sport in Scotland; but unfortunately his system was *wrong*, consisting almost wholly of matches against time, or trots of long-continued endurance. Croydon and Enfield chases were his favourite courses. It might be that James bore in mind the old legend of the Arabian steed formerly presented by King Alexander to St. Andrews; for he at once set about introducing Arab blood into the kingdom; and his first essay was the celebrated MARKHAM ARABIAN, for which he gave to a merchant of that name the very sporting price of *five hundred pounds*—no ordinary figure in those days, but equal at least to two thousand pounds of present currency. This is the first *truly authentic* Arabian that ever reached England. What the exact characters of this horse were we possess no means of ascertaining; but the Duke of Newcastle—considered the greatest judge of horse-flesh of his day—conceived such a dislike to him, that in his *Treatise on Horsemanship*—a book, by the way, displaying much judgment—he describes him as a little, bony, bay horse, of ordinary shape, and almost worthless; and it is certain that, after training, he was unable to run. Possibly his failure was due to the prejudices of his trainer.

The failure of this first attempt to introduce foreign stock did not, however, discourage James. He had conceived an idea which was not to be lightly removed, and he accordingly purchased, from a Mr. Place, a horse which had been brought from the northern coast of Africa. This horse was the celebrated "WHITE TURK;" and this Mr. Place was afterwards stud-master to Oliver Cromwell. This importation was speedily followed by the introduction of the "Helmsley Turk," by Villiers, the first Duke of Buckingham, to which that fine horse, called the Morocco Barb, was added by Lord Fairfax. From this period improvement rapidly advanced; indeed so rapidly as to call forth the lamentations of Lord Harleigh for the visible diminution of the old stock, known as the "Great Horse."

Charles I. followed up the advantages which James had already secured, and warmly encouraged both racing and hunting. Indeed to such an extent was the breeding of light and rapid horses brought by this prince, that it became the subject of a memorial, setting forth that the breed of stout and powerful horses, "fit for the defence of the country," was likely altogether to disappear, unless measures were taken to prevent their doing so. This prince first substituted the use of the *bit* for the old *snaffle*.

Cromwell, Puritan though he was, or affected to be, had his stud of race-horses, and proved that he felt mere bone and bulk to be no match for speed and endurance. He therefore recognized horse-racing as a means of promoting the breed of active coursers, to be connected with his country's welfare. Cromwell had himself trained, in his "Ironsides," the best regiment of cavalry, probably, at that time in existence.

The Restoration seems to have given a fresh impulse to racing, and, consequently, to light horse-breeding. Not only were the courses already established by Charles I. at Hyde Park and Newmarket still encouraged and patronized by royalty; but others were added to the number, and the monarch himself became a competitor for the prizes. These prizes had, up to this period, consisted of a *bell*, a simple trophy; and hence the common phrase, intended to imply success, "he bore away the bell." *Bells* were now abolished, and a *cup*, or piece of *plate*, to the value of one hundred guineas, substituted for them. Newmarket assumed the lead, and that position it has ever since occupied. We may add that, in more recent times, the *cup* or *plate* is not always to be taken in the literal sense of the words; the actual value, viz., one hundred guineas, being, in nearly every case, given to the winner instead. Charles II. sent his master-of-horse to the Levant, in order to procure horses and mares. These were, of course, from the locality, most frequently Turks or Barbs; but speedily every description of eastern horse became engrafted on British stock.

James II. reigned too short a time, and even that short period was of too unsettled a character to admit of his doing much for the improvement of our horses. He was, however, an excellent horseman, and understood the animals well. It is probable that on this account he is still popularly called in Ireland "Shemus-na-cappul," or "James of the horses."

William III. established a riding-school, under the management of a French gentleman, named Major Foubert. He also added several *plates* in different parts of the kingdom.

Queen Anne encouraged racing, and not only continued a bounty equal to that of her predecessors, but added several new plates. It is possible that much of her encouragement was due to the influence of her cousin, Prince George of Denmark. Towards the end of this reign the prejudice against Arab blood, which originated in the failure of King James's horse, was effectually removed by the introduction of the celebrated Darley Arabian. Mr. Darley procured this beautiful horse from his brother, a merchant settled in Aleppo. This was the horse truly calculated to perfect our British stock, and to render it, what it has ever since continued, the first in the world! Of the Darley Arabian, little need be said beyond stating, that he was the sire of "Flying Childers," the fastest horse that ever ran. Flying Childers ran over the course at Newmarket, a distance of three miles, six furlongs, and ninty-three yards, in six minutes and forty seconds; over the Beacon course (four miles, one furlong, and one hundred and thirty-eight yards), in seven minutes and thirty seconds; and also accomplished very nearly one mile in a minute. Such was the first progeny of the Darley Arabian with the English racer. The British horse is now the fastest in the world, and far superior to the Arab even in swiftness. It is not many years since Pyramus, the best Arab in Bengal, was beaten with ease by Recruit, an English racer of scarcely fourth-rate merit.

George I. continued the royal patronage of the turf, and was the first to discontinue the practice of giving *cups* or *plates*, giving *specie* to the value of one hundred guineas in their stead.

George II. adopted the policy of putting a tax on horses. The best that can be said for this policy is, that it is calculated alike to retard the progress of an inferior race of horses, and to remove from the lower class of the people much of the temptation to attend races. This was embodied in an Act of Parliament, passed in the thirteenth year of his reign (cap 2); by which it was enacted, that for any and every horse a certain tax should be paid; besides other particulars, which want of space prevents our mentioning.

In the reign of George III. special taxes were imposed upon racehorses; and in the twenty-fourth year of this reign (cap. 26), it was enacted, that every running-horse, entered to start for any plate or other prize, should, in addition to all former imposts, pay the sum of £2 2s.; "and the owner thereof shall previously pay two guineas, as the duty for one year, to the clerk of the course, or other authorized person." This king, though a man of a religious turn of mind, was strangely attached to racing, which, however, he endeavoured to strip of its abuses, probably conceiving that horse-racing, when properly conducted as a mere trial of speed, was legitimate, and calculated to produce good effects; while it was its abuse alone that rendered it incompatible with true religion. By the zeal of this monarch public riding-schools were established, and this led to the establishment of many private *menages* by the princes of the blood and persons of fortune. His majesty had also one erected specially for himself. He also instituted the first veterinary college with a view to placing the treatment of horses and cattle under disease upon a proper footing. A French gentleman of much skill, Monsieur de St. Bel, was appointed professor.

George IV. was devoted to the horse, to horsemanship, and to the turf, from his earliest years. During his reign these amusements attained a height hitherto unprecedented, and, we may perhaps add, since that time unsurpassed. During this reign, at the termination of our differences with France, the French became infected with our enthusiasm for horse-racing; and our system, regulations, and even the costume of our jockeys, were all eagerly adopted. The Duke of Orleans was the first who assumed the dress of an English jockey in France, and his example was speedily followed by many of the leading nobility.

William IV. having been brought up to the sea, did not, of course, feel much personal ardour for the turf or for horsemanship. He, however, not only offered no discouragement to it, but by his presence and countenance lent to it all the patronage he could bestow.

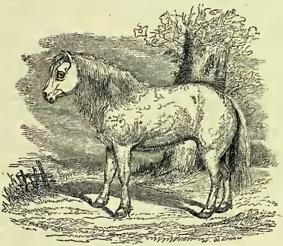
Victoria, our present gracious sovereign, affords every possible encouragement to equestrian amusements. She is herself an excellent horsewoman, as well as a fearless one.

To his numerous and varied accomplishments Prince Albert is now able to add that of horsemanship. On his first arrival amongst us he displayed some degree of awkwardness in the saddle, which was eagerly commented upon by some of the low and disreputable portions of the press. The fact is, that this apparent awkwardness arose from the method of *breaking* the horse in Germany, which differed so materially from that in use amongst us. This occasions a difference of *action*, and hence the *apparent* awkwardness which his Royal Highness at first displayed. The difficulty did not long remain unsurmounted, however; and Prince Albert is now as remarkable for his graceful riding as he is for every other acquirement necessary to constitute the gentleman. Long may he and his consort, our beloved Queen, live and reign!

Having traced the history of the horse in England, from the earliest time of which we possess any record to the present day, though to some such an account must have proved wearisome, we trust that to the majority of readers the contrary has been the case, and that the preceding detail will rather enhance the interest which will be experienced in the more practical portion of the work. Before, however, proceeding to those particulars, it is necessary to say a few words of the horses indigenous to SCOTLAND and IRELAND.

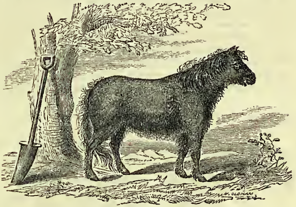
In Scotland a small race of horses has existed from time immemorial, remarkable for their symmetry of form and docility of disposition, and known by the name of GALLOWAYS. So much esteemed were these little horses in former times, that it became necessary for the Scottish monarchs to restrict their exportation. Tradition says that these horses are of *Spanish* origin, and that they originally sprang from Spanish horses which swam ashore from some of the ships composing the redoubted Spanish Armada, which were wrecked upon the western coast of Scotland. This scarcely agrees, however, with the other statements made respecting them; and we are inclined to think them the ancient native breed.

In the islands and northern counties of Scotland is also to be met with a small, rough, hardy race, scarcely exceeding a large dog in size, and called *Shelties.* With the exception of the head, which is generally somewhat too large, these little creatures are most symmetrically formed; being, indeed, almost miniatures of the Arabian.



THE HIGHLAND PONY.

One of these most beautiful Shelties is in the possession of Mr. Vernon, of Clontarf Castle, near Dublin. Most Shelties present some objectionable points about the head—in some instances almost amounting to deformity. This faulty conformation is not present in Mr. Vernon's pony, he being, not only in this but in other respects, symmetrical, as will be seen by the portrait which, with the aid of the pencil and graver of Mr. W. Oldham, is given on the opposite page. This little pony is of a black colour, with a white star upon his forehead. He is rough, with an abundant mane and tail. He stands rather under thirty-six inches in height; but his size will be, perhaps, better understood when it is mentioned that both Mr. Vernon and the writer of these pages, when sitting upon his back, touched the ground at both sides with the feet; neither of us being quite six feet high.



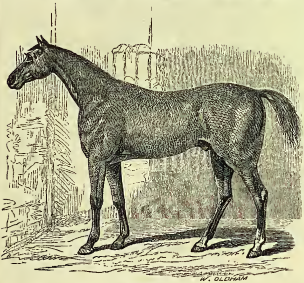
MR. VERNON'S PONY.

This little animal was brought over by Mr. Vernon from Scotland during a tour through the highlands and islands of the western coast of that country. He is remarkably docile and good tempered, and altogether, as has been observed, one of the best specimens of the race.

Ireland also possesses an indigenous breed of horses. These horses are of small size, but of good form, very strong in proportion to their stature, active, and of excellent constitution. These were popularly called *Hobbies;* they were formerly in much esteem, both in their native country and in England; and so great was the mania for possessing them, which at one time existed almost universally throughout the British Islands, that their name became afterwards proverbially applied to every object on which an individual placed inordinate affection. "He is on his hobby," is an expression too familiar to require the reader to be more than reminded of it.

Many of the old writers speak in complimentary terms of these little horses, and bear testimony to the high degree of estimation in which they were formerly held. Both Strutt and Campion have recorded their value in their works, as we learn from the following passages:—"Horses they have of pace easie, in running wonderful swift. Therefore they make of them great store, as wherein at times of need they repose a great piece of safetie." "I heard it verified by honourable to honourable, that a nobleman offered, and was refused, for one such horse, an hundred kyne, five townlands, and an eery of hawks yearly, during seven years."

It has been asserted that the climate of Ireland is too moist to be favourable to the breed of horses. The only reply that we can give to this assertion is a practical one—look to these "hobbies," the indigenous breed of the country, ere they possessed the advantage of crossing from English or foreign stocks, so highly valued everywhere; look at the performances of more modern Irish racers and hunters.

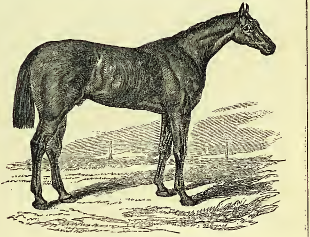


THE IRISH HUNTER.

As a sample of the latter we give this figure. We shall also relate one or two of their performances:—

In the month of October, A.D. 1741, a Mr. Wilde undertook to ride 127 miles in nine hours. He performed it in six hours and twenty-one minutes, riding ten horses, making due allowance for mounting, dismounting, and refreshment. This took place at the Curragh meeting (Kildare) of that year.

The following redounds more to the credit of the horse than to that of the inhuman rider :—Two Irish grooms were drinking at the door of a public-house, one having with him, for exercise, a favourite hunter of his master's. The trifling bet of a glass of whisky was made that the horse would not clear a neighbouring wall. The drunken brute at once accepted the wager, and turning his horse, put him standing at the wall, the height considerably exceeding seven feet. The poor horse, not having imbibed the same maddening stimulant as his rider, refused the leap. The groom immediately wheeled him round, cantered him a short distance, so as to obtain a run, and then putting the poor animal at speed, once more faced him at the wall. The noble creature, too full of spirit to refuse a second time, made his best efforts. Alas! the height of the wall far exceeded the powers of any horse unfurnished with wings, and the generous animal forfeited his life to his courage. His fore-feet striking the summit, he grounded on the other side, and both fore-legs were broken in the fall. Unfortunately the wretch who rode him escaped almost uninjured. The horse's owner being absent from home, the poor animal



FOIGH-A-BALLAGH, THE IRISH RACER.

was suffered to linger for several days in agony. When the owner returned he was shot.

It is principally as high leapers that the Irish horses are renowned, and in this class of performance we believe they are unrivalled. Nor is their style of leaping that of an ordinary horse, taking a moderate elevation in "a fly," as a horse in training will take the bar in a riding-school. The Irish horse leaps with a single bound. All his form being collected together, he rests lightly for half a second upon the summit of the obstacle, and springs as lightly down. The leap of the Irish horse resembles as closely as possible that of the *deer;* and the elevation they will clear in this manner frequently equals the height of their heads. Until a recent date, the Irish horse was valued almost exclusively as a hunter, and for steeple-chases; but events in the racing world have since shown that on the turf he is as little to be despised as after hounds. The performances of Harkaway, the Baron, Foigh-a-ballagh (of the last-named of which we give a portrait on the preceding page), and a host of others, evincing first-rate speed, are sufficient to remove any slur that might ever be attempted to be cast upon the speed of the Irish horse.

It is not to be denied that the Irish horse occasionally possesses some peculiarities of shape which might displease an English eye: amongst others may be enumerated a certain degree of *angularity* or *raggedness* of form, and in many a tendency to too great thickness and shortness in the forehand. No writer, however opposed to the admission that anything *perfect* can come out of Ireland, has refused to acknowledge in the Irish blood-horse the attributes of great power, proportioned to his bulk; of a happy combination of spirit and fire, with, for the most part, mildness and docility, courage, gentleness, and bottom. The best Irish blood-horses may, indeed, fearlessly vie with those of any country in the world.

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CHAPTER VII.

BREEDS OF HORSES CELEBRATED FOR SPEED.

The classification of horses according to their qualities is clearly the most scientific mode of arrangement. For instance, speed is the great desideratum both in the racer and the hunter; and though not the only quality necessary for the purpose, is clearly the principal one.

Speed and power are united in the roadster, the coach and carriage horse, and the Cleveland; whereas, for the purposes of draught only, power and strength are the principal requisites. The different races of draught animals, whether agricultural or dray horses, will be properly arranged under the descriptions of Clydesdale, Suffolk Punch, and the old English draught horse of Lincolnshire. Under these heads will be discussed the adaptation of each class to the purposes intended to be served by them.

Without entering upon a repetition of old stories or useless details, it is enough to observe that the English race-horse is an Arab, enlarged in size by two centuries of careful selection in breeding, choosing the best shaped and largest stock in both parents, and crossing them again, so as to bring out the highest points of excellence, and following this up by a course of feeding on compact and nutritious food, aided by a temperate climate. With all these improvements, the racer of these islands still bears a considerable likeness to the Arab, of which he is undoubtedly the descendant; but he is superior to them in stature, in stride, and in speed. The racer should carry a high and lofty head, should have a small lower jaw, fine muzzle, but wide nostrils, bright and courageous eye, small ear, arched neck, convex on the upper surface, *but not presenting any underneath.*

It occasionally happens that the neck of the racer presents an appearance the very reverse of what we have described, and this usually in mares. It is by many, and especially the Arabs themselves, declared to be a sign of very high blood; and is called "ewe-necked." It is possibly, however, less a sign of *blood* than a proof of the animal's progenitors having had that hereditary formation transmitted through the race—a circumstance that should, when possible, be avoided.

A racer must be a *blood* horse. The meaning of this term is as follows :—The Arab is supposed to be the purest and least adulterated of breeds, and to be the most faithful representative of the original horse. The criterion of *blood* is therefore the circumstance of being able to trace a horse's pedigree to an Asiatic progenitor. *Thorough-bred* and *blood* are synonymous terms. It does occasionally, though rarely, happen that a horse is perfectly formed, though not *thorough-bred.* When such is the case, the horse, notwithstanding his form, is usually deficient in speed, and, however excellent for other purposes, is useless as a racer. It also occasionally happens that a thorough-bred horse is defective in some of the *running points* of form. In order, therefore, to constitute a racer, we must have a combination of *blood* and *form.* An ill-formed horse cannot run; and none but a *blood* horse can race at full speed to the end of a long course, and survive the effort.

Captain Rous, R.N., a high authority on the matter of blood horses, says—"The English race-horse boasts of a pure descent from the Arabian, and under whatever denomination the original stock of our thorough-bred horses have been imported—viz., as Turk, Barbs, or Royal mares—there can be no doubt they were selected by the patrons of the turf, and by their agents, during the reigns of James I. and the two Charleses, and James II. and the Commonwealth; and whether they were brought from Barbary, Turkey, or the Continent of Europe, they were considered as the true sons and daughters of the desert."

Though it is perfectly true that we trace every race-horse of acknowledged power and speed back through the stud-book to an Arabian ancestor on one side, it does not by any means follow that they were not all more or less crossed by the native English horse, of some quality or other. The produce of the first stallion, the Markham Arabian, must have been so; for the next importation of mares could not be served by any pure Arabian stallion; the Markham could not then have been living, and we know of no intermediate importation. Hence, though there may only have been one cross of the native blood, and that carried back again to the Arab, it is impossible to say that the acclimatized constitution of the native sire or dam did not add to the blood, the fleetness, the bottom, and density of bone of the Arabian, which resulted in a horse of greater power, and even greater speed, than the Arabian itself.

Much controversy has taken place, to prove that the English race-horse has exceeded the Arab, his progenitor, in speed and power. It is alleged that either the British climate, or more attention to breeding, has produced this improvement. It by no means follows that either is the case; the Arab may have degenerated,—for it is difficult to believe that the practice of the Bedouins would long keep up the high breeding of the animals. It may possibly be easier, also, to raise a breed from a great variety, by careful selection, feeding, and training, than it is to keep a once pure breed free from defects. Captain Rous, the writer to whom we before referred, says, that so far from our climate being especially favourable to the development of the Arabian, it is just the reverse. The pasture, he argues, and the extreme care and attention in breeding from the best parents, on both sides, is the cause of our superiority; it being generally admitted, by the most experienced men of the turf, that a first-class English race-horse would give six stones to the best Arabian which can be found, for any distance under six miles. The only instance, however, in which this has been fairly tried, was in 1828, when a match was made at Calcutta between the English horse Recruit, carrying 10 stone 8 lb., and the best Arab at that time in India, Pyramus, carrying 8 stone 3 lb., two miles. Recruit had been a very short time in India, and had tender feet, which disabled him from taking strong work, notwithstanding which he won in a trot! On the other hand, the Pacha of Egypt, three years ago, challenged the English turf to race with their best stock on the plains of Egypt, against a native horse,—a challenge which was declined.

In support of this argument, it has been declared to be an established fact that no first or second cross from an imported Arabian, with the exception of one mare's produce—the Wellesley Arabian—is good enough to run for a fifty-pound plate at the present day; whereas, in 1740, our best horses were all second and third crosses from the original stock.

The most distinguished primogenitors of the English race-horse are the Byerley Turk, the Darley Arabian, Curven's Bay Barb, and the Godolphin Arabian; there having been no horse of any eminence in England, during the last two centuries, which has not inherited their blood. Of the first two named we know very little, only that they were sires of Basto and Flying Childers; but the blood of the Godolphin Arabian is in every great stable of the kingdom. He is described as having been a thick-necked, heavy-shouldered, overtopped horse, without apparently a single point adapted to racing qualities. Now, although he might be an exception to the rule, still the early crosses with the Arabian, as has been satisfactorily shown by the anonymous Harry Hieover, were by no means celebrated for following their Eastern sires in the leading points of beauty. Eclipse had, says this lively writer, by no means a beautiful head. Dick Andrews, as good a horse as ever ran, had a very large head. One of the most celebrated stallions and racers of late years, Touchstone, had not a fine head. Cymba he describes as having had a head more fitted for collar work than for racing. Mendicant had a very large head; while that of Van Tromp he describes as really ugly, "added to not the handsomest body in the world; and that truly capital and honest horse, St. Lawrence, had a head showing less breeding than I should wish to see in the head of a hunter."

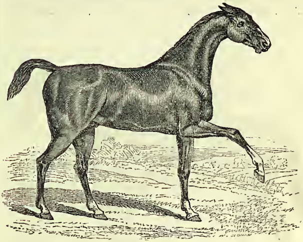
Some writers contend that there is great degeneracy in the English racer of the present day. Hookham makes out a strong case on this point. He states them to have lost vigour and stoutness, and that the pursuit of the single object, speed, has effected this change. Heavy stakes, and single runs of short distances, he contends have effected this; and the result he gives as producing weakness, and disposing to coarseness. They have, he contends, flat sides, long backs, long and therefore weak limbs, and are sadly different from the short back and limbs, capacious chest, and full size, allied with constitutional vigour and stoutness, of the older horses, which have all been sacrificed to get an addition to the stroke. Captain Rous contends, on the other hand, that "the form of the best race-horse in 1750 is inferior to that of a commonest plater of the present day." He has, we believe, overrated the capacities of the modern racer, and underrated those of the period a century back.

Those who are fond of asserting that our horses are degenerating in excellence, and, in proof, recapitulate the performances of some of our coursers of former days, are in error. It would probably be more correct to say that our horses have so much progressed in excellence, that feats once deemed extraordinary are now regarded as commonplace, and scarcely talked of. Thorough-bred horses are now, in consequence of the great general improvement, more equal in point of speed, and fewer *individual performances* occur to excite wonder.

On one point, however, before leaving the subject of the racer, I would take this opportunity of expressing my unqualified opinion,—that the abominable practice of running horses at too early an age, which is at present fast creeping into fashion, is but too certain to produce early foundering and rapid degeneracy of stock. I would also suggest that the evil resulting from a passion for mere speed is the proper punishment for the immoral spirit of the race-course—a field fruitful for the practised sharper, tending to sow laxity of morals and a gambling spirit among the lower orders. While the better portion of the upper classes are almost entirely forsaking races, the cheap trains are increasing by thousands the attendance of the people; and the distress occasioned in families by the results of the race-course is often as heart-rending as it is incalculable. The low betting-houses are becoming the moral pests of society.

It is not, perhaps, generally known that the common expression, applied by jockeys to a well-formed horse which cannot race, "he wants *heart*," is literally and anatomically true. The heart of a racer must be *large*, and the cavity of the chest capacious. The lungs also must be large, and play freely. The heart of Eclipse—who, next to Flying Childers (whose portrait we annex), was the fastest horse that ever ran—was of a singularly large size, weighing upwards of fourteen pounds. The expression "broke his heart" is also, in many cases, literally correct, that viscus being not unfrequently burst or ruptured when the poor animal has been pushed to over and undue exertion.

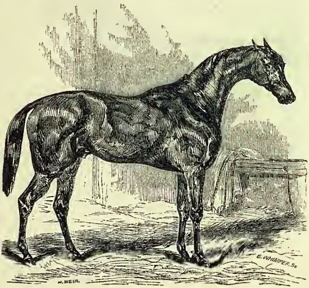
To return, however :—The neck must be gracefully set on, and the shoulder must be lengthened, oblique, and lie well back. A lofty fore-quarter denotes relationship to the Barb; that race being remarkable for presenting this feature. The Godolphin Barb, indeed (sometimes erroneously called the Arabian), possessed this feature to such an extraordinary degree that the truth of his portrait has been questioned. That which we have extant, however, is from a picture originally taken by a French artist, and copied by the celebrated Stubbs, of which our engraving, at page 47, is a no less faithful copy. The quarters should be ample and muscular; the fore-legs straight and fine, but with sufficient bone; the hinder legs well bent, and the pasterns long and springy. Much strength in little compass, provided that compass is not too little to admit of adequate stretch, or *stride*, constitutes the *acmè* of perfection in a racer.



FLYING CHILDERS.

We have selected Flying Dutchman, the celebrated winner of the Derby for 1849, as a good specimen of the blood of the present day. This horse was bred by the late Mr. Vansittart in 1846; he was by Bay Middleton, out of Barbelle, her grand-dam being Selima, by Selim. Bay Middleton was also got by Selim.

The Flying Dutchman is a dark-brown horse, with no white about him beyond the saddle mark; he stands about fifteen hands three inches high; has a lean head, Roman nose, full fiery eye, prominent forehead, and ears carried a little back. He has a strong neck, a little bowed; fine deep shoulders; measures five feet six inches in girth, round barrel; powerful back, rising a little on the rump; strong quarters, well let down; light thin tail; good thighs; immense arms; and very large bone. He stands a little over at the knee, but is altogether a magnificent specimen of the power of a race-horse. Flying Dutchman started five times in 1848, and won—



FLYING DUTCHMAN.

The July Newmarket Stakes . .	£1110
A Sweepstake at Newmarket . .	600
A Sweepstake at Liverpool . .	1200
The Doncaster Champagne Stakes .	825
The Doncaster Two-year Old Stakes .	560

In 1849 he started at Epsom, winning the Derby Stakes, £6320. At the Ascot meeting of 1850 he carried off the Emperor's Cup; but it was reserved for the spring meeting, at York, which came off May 13, 1851, to test his powers. On this occasion he was matched against Voltigeur—a horse in every respect a fair match for him—for one thousand guineas. The race caused great excitement on the turf, and betting was in favour of Voltigeur. At starting, the latter took the lead by three lengths, and kept it over the greater part of the course, but towards the end he drew up, and finally won with ease by a length. The race was run in three minutes thirty-three seconds, and, at its termination, his noble owner, the Earl of Eglinton, declared his intention that he should not run again.

The British racer has long held a first place in the estimation of the equestrians of Europe. It is well known that Napoleon, when in the zenith of his power and glory, conferred an order of high military rank upon a German prince, in return for his having brought to France, in his stud, the progeny of the celebrated English horse, "Morwick Ball;" and it is not very long since the French were purchasing a considerable number of half-bred horses in England and Ireland for the use of their cavalry, and that, too, at a very high average figure, viz., from £30 to £40 a-piece.

THE HUNTER is another of the breeds of horses where fleetness is an essential requisite, but where power and endurance are also equally necessary. Hence all is not here sacrificed to speed, as is too much the case with the racer. The hunter has not to gallop for a very few minutes only over a firm and level course; he has to leap over high fences and broad ditches; he has not to carry a make-weight, but sometimes a bulky rider, over soft ground and hard, and has to continue this sometimes for hours over countries as varied in their character as the game he pursues, or the hunter who bestrides him; hence, though he requires less stride than the racer, he requires more compactness—more stamina—more power. He requires a *broadness* as opposed to the racer's *length*. He requires muscle as well as bone, and he needs also the strength necessary to meet the difficulties of the various strains on his sinews and his muscles. He must have slanting shoulders, and well-bent hocks, powerful arms, all round, and broad feet. He must have a small head and wide nostrils, as indicative of spirit; he must have his ribs and his hips near each other; and he must be well ribbed home. He is usually better than half-bred; that is, he is able to trace his blood on one side to the pure Arabian. But the most favourite hunters are beginning to carry a better share of pure blood than even this.

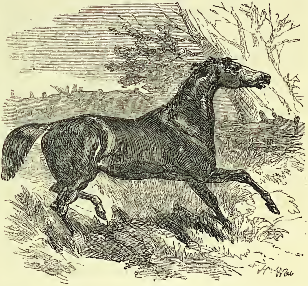
Harry Hieover, a great authority on horse flesh of all kinds, takes the ground that the hunter, to be a good sound horse,—trusty, and well-bottomed,—requires even more pure blood than the racer himself. He says:—"It was formerly supposed that thorough-bred horses were unfit for hunting; thus jumping to the conclusion, as our ancestors did, that they would not go through the dirt, or live with hounds, in a heavy country. Later periods have proved the fallacy of such conclusions, and we find that in deep ground and difficulty it is *blood* that tells. That it does away with the actual racing speed of the race-horse while in such ground is a matter of course; but the quantum of speed he can use in such impediments makes the lower bred one sigh at his plebeian origin. If the race-horse can go in heavy loam or clay, why not in sand?"

The celebrated Nimrod was of the same opinion with Harry Hieover. After describing the hunter of last century with due praise, he adds—"All these accomplishments, however, would never have enabled a horse of this description to carry the modern sportsman, who rides well up to hounds on a good scenting day over one of our best hunting countries. His strength would be exhausted before he had gone ten minutes, by the increased pace at which he would now be called upon to travel." For, as this celebrated writer goes on to explain, the dogs, as well as the horses, have now a dash of blood, which gives accelerated speed to the chase, and requires a good mount indeed to see the end of it.

Steeple-chasing, which came into fashion about fifty years ago, and which has been kept up with much spirit ever since, has also increased the necessity of having nearly thorough-bred horses trained as hunters.

We select, as a specimen of this class, Old Lottery, one of the best horses of his day:—"Barring water-jumping, at which," says a writer in the *Sporting Magazine*, "he was a sad sloven, a more perfect hunter never existed; and the style in which he beat 'Seventy-four' at Leamington, stamped him a horse of undeniable speed." The same writer, Colonel Chasse, says, "The last thing we heard of Old Lottery was, that he had fallen into the hands of a gentleman who used him for short rides over the farm, but never putting him to a fence, as such exertion made him pass blood."

The hunter therefore (in a country like this, abounding with hedges, stone walls, and heavy-ploughed lands) should be bred with a view to greater power than is requisite in the racer. *Length of stride* is therefore less essential to his form than *barrel.* Let his *legs* and *pasterns* be rather *short* than otherwise. An Arabian would speedily founder in a run with hounds across one of the most level of our British counties. *Clumsiness* is not, however, a necessary concomitant of power. The hunter should have as much *strength* as possible, without *weight;* sufficient courage, without wild and tameless fire; good wind, capacious lungs, a free gallop, but, at the same time, a light and nimble, and a free, easy, *sweet* trot; and let him be *six years* old before he is ridden to hounds. A horse may be advantageously used in the *harrow* or other light *draught* when rising *four*, and may thus be made to "pay his keep." Many recommend putting a hunter


OLD LOTTERY.

in the *plough* a day or two in each week, under certain conditions—viz., that the land be not *heavy*, and the plough be a light one. If these conditions be not attended to, the horse is apt to acquire an ugly carriage, and a habit of *poking* with his head—faults which, however lightly they may be regarded at first, will prove serious inconveniences when they cause the hunter to fall headlong in full career, from the habit he acquires of being unable to use his eyesight when his head is kept up and in hand. This custom of working young hunters,—indeed, to a great extent, *old ones* also,—prevails extensively. There are few farmers, or small landowners, who do not strive to keep at least one *blood horse;* and in many instances the finances are too low, or prudence is too great, to admit of such being kept as mere idlers. The practice of accustoming such horses to draught, however, should be cautiously adopted.

Much controversy has arisen relative to the advantages or disadvantages of what is called summering the hunter. In our opinion, nothing so tends to renovate his powers as turning the poor horse out to grass in summer. The opponents of this system argue that doing so destroys the animal's condition, and gives his owner a world of trouble to get him in order for the ensuing season. Even admitting this to be the case, would you keep a poor wretch that has served you so faithfully during your winter's chase, standing in a hot stable during the sultry heats of summer, and this only to save a little trouble? Oh, but some hunt during the summer months! Shame upon such selfish men—men unworthy of the name of British sportsmen; cruel alike to the animals whose service they employ in the chase—those noble creatures, the horse and the dog—and unnecessarily so to the poor animals they hunt, whose breeding season it is. These men, for a very short period of doubtful pleasure, injure their horses, their hounds, and themselves; and also mar the legitimate sports of the coming season.

There is nothing like summering for renovating the hoofs; and with a view to this, a soft yet not a boggy pasture should be selected; and if within reach of salt marshes all the better,—the salt having a healing influence on the hoof. The grass growing on a boggy soil is, however, unhealthy, the vapours and steam arising from it prejudicial, and the fly far more troublesome than in drier grounds. This mode of treatment has another advantage: it obviates the necessity of physic, of which the less a horse has given him the better. The celebrated Beckford was a strenuous advocate of this system; indeed, of every system connected with rural sports tending to promote humanity to the animal. As a further inducement to adopt his views, he adds, that "your horses will require less of the groom's exercise afterwards; which, if you value an easy mouth, and a comfortable seat, you will find no mean desideratum. I must qualify this opinion of mine, however, by adding that Nimrod, Hieover, and some of the best modern authorities, are opposed to it. Nimrod states that the advantage of the new system of preparing hunters for the field is so obvious, that the old one of turning him out to grass in the summer is not adopted in the best stables." He adds many other arguments in support of his own views, all deserving great weight, coming from such an authority.

Hunters must be fed according to their work.—When this is hard, let them have plenty; when otherwise, diminish the food, especially the hay. Beckford judiciously recommends a little clean wheat-straw to be chopped small, and mixed with their corn; "if," says he, "you have interest enough with your groom to prevail on him to give it to them." Our advice is, if you have doubts of your groom obeying your orders, see to it in person. The eye of the master makes a fat horse.

When your horses require physic, if at grass, take them home the first night after each dose. Such as require powerful medicine should be physicked in the stable. Nitre is a useful medicine; it is very cooling, and otherwise salutary in its effects, as an alterative. It may be given in doses of an ounce to each horse, either in water, or among the corn. Carrots are excellent for horses when at all thick in the wind, foul in the coat, or low in flesh; but they should not be given in the corn, as some writers recommend, for the horses are apt afterwards to refuse it unmixed.

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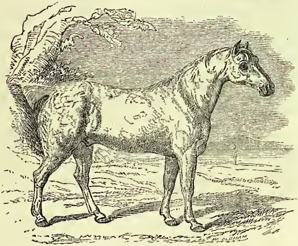
CHAPTER VIII.

BREEDS COMBINING STRENGTH WITH SPEED.

If the hunter must possess the speed of the racer—combined with power and bottom, to enable the lover of sport to pursue with fleetness the cunning fox or the timid hare, through a long day's work, over a rough and uneven country—the Hackney or Roadster must combine, with a certain amount of speed, the power which is necessary to carry a heavier weight for a still longer period. He must have bone enough to carry his weight, with great compactness; he must have muscle and sinew to enable him to bear up under his load for a long period without fatigue; and he must have action, so as to allow the rider to sit easy; for, while the sole action of the racer is stride and energy, and that of the hunter is the two combined with muscle and stamina, the roadster, travelling usually on hard roads and at all paces, must have *action* of an order very superior to either of the other. The action of a race-horse in his gallop is one to which his rider will soon accustom himself; and that of the hunter is less felt in the inequalities of a country—in the excitement of the leap and a hotly-followed chase; but that of the roadster must be sweet and pleasant —no propping, hobbling unsteadiness, but a gentle, easy, spring-like motion, arising from slanting of the shoulder, lifting of the leg, and elasticity of the tendons and muscles of the arms. Hence, though they appear stiff to the observer, they have action as easy in reality as if the rider were seated in a carriage made with artificial springs.



THE HACKNEY, OR ROADSTER.

In form, the hackney should be still more compact than the hunter, with more substance in proportion to his height; his forehand should be light, but high; his head small, and placed in a tapering manner on his neck; shoulders deep and spacious, and lying well back; loins strong; back straight; fillets wide, and withers well raised. Nor must the croup droop too suddenly, or the tail be set on too low. The fore-arm should be particularly strong and muscular; the legs should be straight, and set well together; the feet should point directly forward (bad shoeing, however, which may be remedied, frequently occasions the reverse of this): above all things see that the knees do not bend; and avoid the horse that *stands over* them. He does sometimes turn out well, but you can never depend upon him, never knowing when he may come down. The hind legs should be placed well back, and should stand wide apart. Observe his action, that he lift not his feet too high. However the novice may conceive such a practice to be a safeguard against stumbling, or to have a showy appearance, it is certain to produce a most uneasy seat, as well as to occasion very unnecessary wear and tear of the hoof. Take care, at the same time, that he lift not his feet in a slovenly manner, or too low; and that, above all, his feet are returned flat to the ground. If the toe first comes down, the animal is sure to prove a stumbler. Always *feel* your horse's mouth, even when travelling the smoothest road: this is a good *habit*, and may frequently save him his knees and you a fall.

In Ireland, the hackneys, or ordinary riding-horses, exhibit no inconsiderable amount of thorough blood,—a circumstance which derives its origin from the fact, already adverted to, of farmers and country gentlemen keeping brood-mares in work, and putting them, when in season, to whatever blood-horse is standing in the neighbourhood, at a moderate charge. Too high breeding is objectionable in a roadster, as tending to impart a straight-kneed, upright action, calculated extremely well for racing, but very ill-adapted for the road.

In speaking of the hackney, or ordinary riding-horse, it would be wrong to omit saying a few words of the horse generally used as a WAR-STEED or CHARGER.

The art of war has materially changed since the Norman horse was introduced into this island, and by his superior power and weight overcame the lighter mounted native cavalry. The bogs and forests required power and strength to go through them; and, so long as the art of war depended on hand to hand combat, power was everything. Hence the powerful Norman horse overmatched the less heavy and enduring charger. But now, since the face of the country is changed by cultivation and civilization, it is questionable if a fleeter horse does not much more fully answer the purpose. Napoleon, moreover, finished what the discovery of gunpowder began, and established a system of warfare the entire tactics of which depended on the *rapidity of its movements.* Here a lighter horse with more action was required, and the whole cavalry of Europe has gradually merged into the light, active, and hardy charger of the present day.

Endurance, however, is equally necessary as a qualification for the war-horse, and this can hardly be got but by a dash of Arabian blood; hence the contractors of horses for the army are required to look to the compactness and spirit of the horses they are commissioned to purchase both for the British and Continental armies.

The light cavalry are now mounted on half bred horses, possessing much of the character of the hunter, and indeed some present no inconsiderable appearance of blood. Formerly all our cavalry were mounted on great, heavy animals, partaking closely of Flanders stock; but it is now found that lighter and more active horses prove far more effective in the field, and that rapidity of evolution was a greater desideratum than mere physical weight or strength. What is known as a "weight-carrying hunter" is about the best description of horse for a charger. The horses of the artillery display less appearance of blood than the ordinary charger, and when *cast*, as it is called, are well worth the attention of agriculturists, as they are docile and willing, and make excellent servants either for the cart or plough.

TROTTING HORSES.—The most celebrated trotting horses of this country have been bred and reared in the counties of Suffolk and Norfolk. The traffic between these counties and the metropolis, chiefly in supplying food for its increasing population, led to the early employment of vans, which were required to travel at an accelerated speed. To horse these vehicles the fastest animals in the respective counties were selected; and from one of this class, known as Marshland Shales, most of the trotting horses are descended. The most remarkable of these was the mare Phenomenon. This mare, the property of Sir Edward Astley, trotted seventeen miles in fifty-six minutes; a month afterwards she went the same distance in less than fifty-three minutes, going a four mile course of that distance in eleven minutes,—as nearly as may be twenty-one miles and three-quarters in the hour. After many vicissitudes this wonderful animal seems to have fallen into humane hands, having become the property of the late Sir R. C. Daniel, by whom she was properly treated. The performances of this extraordinary mare have never been surpassed.

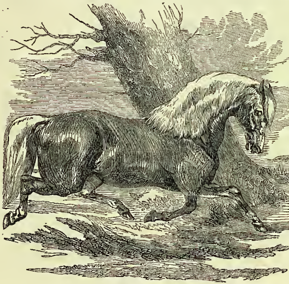
In 1822 a match was made between Captain Overton's horse and

Mr. Bernard's mare, near Gerrard's Cross, for four hundred guineas, which was easily won, by the mare performing the distance in twenty-seven minutes and fifty-six seconds. The horse went the distance in two seconds more,—very nearly nineteen miles and a half in the hour.

The Americans have produced some very extraordinary trotting horses. Of these perhaps the most remarkable was Tom Thumb, formerly possessed by Mr. Osbaldiston. He was matched to trot a hundred miles in ten hours and a half, and accomplished his task twenty-three minutes under the time, and did not throughout exhibit the slightest signs of distress. The stoppages on the road occupied thirty-seven minutes of this time. An English-bred mare was afterwards matched to perform the same feat, which she accomplished in ten hours fourteen minutes; of which time thirteen minutes were occupied in stoppages. She suffered no inconvenience; but it is gratifying to know that her owner had given instructions to the driver to stop at once if she showed symptoms of distress.

Many other trotting horses have occupied the attention both of this country and America during the last few years. None perhaps more than the horse Confidence, well known in the neighbourhood of London, eight years ago. This was a very handsome bright bay horse, rather under fifteen hands, with black points and handsome tail, and well developed form. Such, however, has not always been the appearance of trotting horses. While writing, a scene occurs to us, in which the performer presented a very different appearance. On a fine summer afternoon, some few years ago, and near to Epping Forest, might be seen a smart four-wheeled phaëton, going along the road at the rate of ten miles an hour. The driver passed a market-cart, of a very ordinary appearance, occupied by a stout, ordinary-looking man, drawn by a still more ordinary-looking black horse, about fourteen and a half hands. The phaëton had left the cart a hundred yards or so behind, and the driver thought he had parted company with it; but while the thought was passing, the cart whirled past, and shot far ahead of him. Here it lingered; it again fell behind, and again performed the same part, in spite of the efforts of as willing a horse as ever was put in harness. The driver's attention was drawn to the action of this horse; and had he not witnessed this scene, it is certain that the truth of Mr. Weir's representation of Silvertail would have been doubted. The feet of the animal, when his powers were put forth, seemed to skim the ground without touching it, and we cannot doubt but that he was performing his eighteen or twenty miles an hour. The owner of the horse was ready to back him to any extent, and for any distance. The driver of the phaëton was satisfied by finding it was no ordinary animal which had so defeated his own favourite, and proceeded on his way.

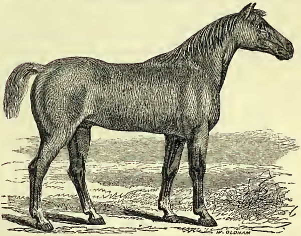
Silvertail was another of these extraordinary horses: he was not discovered to be a trotter till past his tenth year, when the person who was riding him got angry with him, and beat him severely, which had only the effect of making him trot faster, instead of breaking into a gallop. On making this discovery several matches were won by him, and he was sold for £100. He was afterwards sold for much less. Then he increased in value. But his owners and matches were so numerous that we cannot here enumerate them. He trotted sixteen miles and a-half in the hour when twenty-eight years old. In colour he was a rich cream-colour, with white flowing tail and mane. When trotting he had very high action, and carried himself well.



THE TROTTING HORSE SILVERTAIL.

Some hackneys are also famous for their power of walking—a most invaluable quality where it exists in a high degree. The most valuable of the Australian horses are remarkable for this quality, and prized accordingly; for, while in that country any horse serves for the chase and ordinary riding in the bush, the journey horse is highly valued. It is no uncommon thing for one of these horses to walk a hundred and fifty miles in three days, travelling ten hours a-day, and continuing that performance unceasingly for many days. Indeed Australia seems destined to become a great breeding country for the horse. Its extensive plains, and the purity and dryness of its atmosphere, admirably adapt it to the constitution of the horse. The Anglo-Saxon race, true to their characteristic, have already established races in nearly every village in the three colonies, where every encouragement is given to breeding.

The Carriage Horse.—The first use of the horse, after his subjugation and domestication, was undoubtedly that of carrying his rider on his back. This would be suggested by his having four legs



THE CARRIAGE HORSE.

and a back suited to carry a burden, and, above all, fitted to be bestrode by his master—man. But soon his power of *drawing* a burden after him would also be obvious. The fitness of his shoulder for this purpose would very speedily manifest itself. Hence he would draw first perhaps the sledge, then the wheeled carriage,—both for the purpose of transporting his master from one locality to another, and also for transporting his food and his conveniences in any direction which might be necessary. For these purposes he required power for the heavy weight, and speed for the lighter. The ratio between speed and power, so easily reduced to a graduated scale in the inanimate steam-engine, is equally applicable to animal power;—mean capabilities being taken into consideration in both cases equally. The ultimate power of a horse depends on the amount of weight he can draw in a given time,

Thus, taking an average horse to be able to draw one hundred and sixty pounds, his pace would be two miles per hour. There is a great mistake generally prevalent as to the force of traction a horse possesses. Take a plough as a criterion; the lightest two-horse plough draws equal to one hundred weight, or 112 lbs. per horse, and he walks at the rate of three miles per hour, for ten hours a-day; while the heaviest plough in which two horses are put will take fifty per cent. more force of traction, or say one hundredweight and a half per horse. The carriage, however, rolling an wheels, differs altogether from the plough, and requires a different sort of animal. The horse requires less *power*, and consequently is calculated to travel at a greater *speed*, and with a much less weight. An attempt has been made by Stewart to construct a ratio of speed and power, and it is very interesting to trace such an adjustment.

Pace, in miles per hour.	Power exerted, in pounds.	Duration of exertion, in hours.	Pace, in miles per hour.	Power exerted, in pounds.	Duration of exertion in hours.
2	112	10	7	32	5
3	74·6	9	8	28	4
4	56	8	9	24·8	3
5	44·8	7	10	22·1	2
6	37·3	6	11	20·36	1

As an illustration of the nature of the different kinds of work, he gives the instance of the Glasgow and Edinburgh waggons, with four wheels, when an average speed of two miles per hour was travelled, and a weight conveyed of three tons, including carriage, and a distance was travelled of twenty-two miles per day.

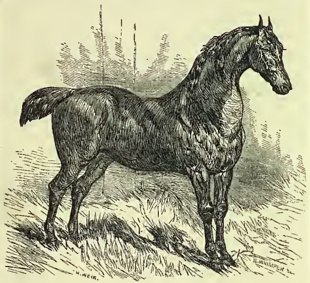
Whereas, taking the Glasgow and Edinburgh night mail coach, ten miles per hour were travelled, an average weight conveyed, including carriage, of one ton and fifteen hundred weight, and nine miles per day were travelled over. There can be no doubt, however, that the waggon horse would live many a long year, under such work, after the poor coach horse was whipped to death.

An anonymous writer in the *Sporting Review* thus describes the characteristic of the old coach horse—an animal fast disappearing, and a specimen of which we may soon expect to see, stuffed, in the British Museum as a curiosity:—

"He should have a well set on head, good shoulder (though it is not necessary it should be so well up as for a hack), and, if it is rather loaded, it is no objection for a draught horse; good loins; sides well ribbed up; strong thighs and well-spread gaskins; flat legs, and good sound feet. Very high action in the coach horse is not to be desired, as both its legs will wear out the sooner; it is of greater importance that the foot be put down flat and well, and that the toes are not dug into the ground. If a horse puts his foot on the ground as he should, he will never stumble."

The best and most showy carriage horses are those descended from Norman blood. Those in ordinary use are now bred with so much blood as to present very little difference of appearance from the hunter. The best carriage horses that could be bred would be produced by crossing a handsome draught-mare with a thorough-bred horse, provided the latter was possessed of sufficient bone and height, and the mare of symmetry. The best description of draught mare that could, perhaps, be selected for this purpose, is that called the CLEVELAND BAY, a clean-made but powerful animal, and one which was formerly much in use to mount our cavalry.

It is not an easy task to find a good description of the Cleveland Bay,—a horse fit in itself for all sorts of work; that is to say, combining more of all qualities, draught, speed, and power, than perhaps any horse we could name; and yet possessing none of these in too high a degree. There are few races of horses which a cross with the Cleveland will not improve in making it fit for all work. Strong as is the clay of the Vale of Cleveland, still the horse is light, clean-legged, and compact,—good in bone, and excelling both in speed and in action;—will draw the cart or plough with cheerfulness and facility—will take his master to fair or market with pleasant action if not with spirit—will pull gallantly, if not at high speed, his dog-cart or his gig—nay, will on a pinch carry him after the harriers, or even the fox-hounds, over a heavy country; and, though she can neither fence nor gallop so well or so fast as some, she will carry him fairly through a long hard day. It must be confessed, however, that she is here more out of her element than, perhaps, in any other service. In herself she is neither a roadster, a coacher, nor a hunter; but give her a cross of blood, and her progeny is fit for anything. An excellent drudge of all work; she may be made useful in her way for all, by judicious crossing. Hence the pure-bred Clevelands are fast dying out, and it is hardly possible to obtain them without some alloy. The farmer, who uses draught horses, finding his clay much more tenacious, since it was taken out of grass in the war-time, crosses his Clevelands with a draught horse of the heavy old English kind, and a mongrel, sluggish, draught horse is the result. The more ambitious breeders cross with a coach-horse, and a larger and more powerful animal is obtained; while others cross with full blood, and get either a carriage horse or a hunter. But they spoil the true breed. The Cleveland is nearly always *bay* in colour. He is round and short, well ribbed home: small head and small neck, round barrel, full chest, good quarters, muscular legs, and a form generally expressing compactness.


H. WEIR.
E. WHIMPER SC.

THE CLEVELAND BAY.

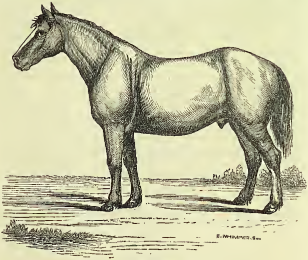
CHAPTER IX.

BREEDS CELEBRATED FOR STRENGTH.

Whatever share the fleet sons of the desert may have in our rural sports, or whatever they may be supposed to add to man's safety, there is no other race of horses so utterly indispensable to man as the draught horse. He is the substratum of all animal power. He tills the land; he carts the produce in its raw and manufactured state; he is the precise link between civilization and barbarism; nay, without him it is impossible to conceive a state of very high civilization at all. There are three prevailing breeds in Great Britain, which are each of them valuable in their way, and for their locality,—the Clydesdale or large Scotch horse—the smaller but not less broadly developed Suffolk Punch—and the old English Draught Horse, which forms the medium between the two preceding, and is the parent of the dray horses in London.

The present breeds of draught horses in England are remarkable for their gigantic size, vast power, and slow, deliberate motion. The most esteemed Scottish horse is the Clydesdale; for that breed, although of large size, possesses greater suppleness of limb and more activity than the heavy Flemish. He is not unfrequently from sixteen to sixteen and a half hands high. Power more than beauty, however, is their prevailing characteristic. They have often large heads, ill-defined jaws, and round sour-looking muzzles. They are sometimes rather flat in their sides, and plain and low in their quarters. Still they are the most powerful and enduring horse known for the plough and the cart. The neck is long, and so are the legs; but the barrel is light, the temper tractable and docile, and he is always found a willing slave. Though very large in size they have not any clumsiness of appearance, owing to the long clean legs on which they stand; and, though heavy, they get nimbly over the ground, owing to their very large stride and their good action. Still they eat a large amount of food, and are not by any means the cheapest kind of horses for the farmer. Indeed the experienced farmers of Scotland confess that their horse-keep exceeds that of England—unwilling as they are to allow any advantage in management to the English farmer over their own.

The English Cart Horse, bred chiefly in the midland counties, is a very powerful animal, and used for agricultural purposes; but the most powerful specimens are sent to the large towns as dray horses. The colour is generally black. The whole form is so constructed as to possess great power; and the gentle willing obedient nature of the animal renders him one of the most valuable slaves of man. The head of the cart-horse is not always thick and chubby; it is often, on the contrary, finely formed, the neck arched, the shoulders thick, the breast very deep, broad and capacious; the shoulder but slightly slanting; the legs, especially the fore ones, very muscular; the back a little slack, arising from high feeding; great rotundity of form, and well ribbed in. Short fetlocks and round hoofs complete the picture of one of the most noble and massive animals—combining with its amazing strength the gentleness and docility of a pet; so that an infant might drive him. The peculiar click of the tongue by his owner will set him to draw a couple of tons weight cheerfully, while he is instantly obedient to the carter's "woa;"—an "aw" turns him round to the left—while a "gee" possesses the same power in turning him to the right; and he possesses endurance, and patience, and affection, which renders him even intelligent. Happy plough-

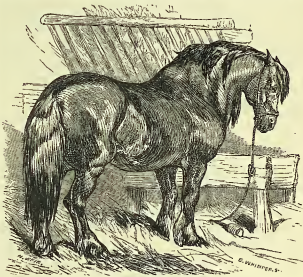

E. WHIMPER. Sc.

MILBURN'S BLACK HORSE, FARMER.

man! whistling your merry tune, the horses gallantly tossing their heads in delight; you live in light, and air, and freedom, and glow under the radiance of the canopy of heaven.

The preceding engraving is from a very perfect animal, which took a prize, among thirteen, at a large agricultural meeting. He was bred by the editor of this treatise; and this portrait was taken by the Daguerreotype process; but the engraver has failed to convey all the spirit of the living animal.

The brewers of London have been long celebrated for their enormous horses; and the utility of their prodigious size has been often thoughtlessly questioned;—*thoughtlessly*, because their bulk is absolutely necessary to enable them to endure uninjured the shocks they experience in drawing their heavy loads over a rugged London pavement.



THE DRAY HORSE.

M. Huzard and M. Desmarests assert that these great horses are of the Boulogne race of France; but Colonel Smith contradicts this assertion, and affirms, that "no French horses, save those of

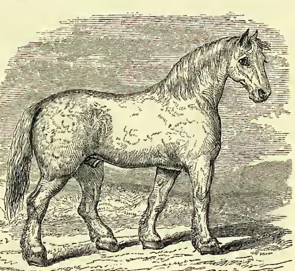
Norman blood, have met with consideration in England for many a century."

The English draught horse was, in all probability, an animal of *gradual development*—first imported by the Saxons, and subsequently gradually improved in size and power by crossing with the Flemish horses, introduced by the followers of William of Normandy, who obtained a large grant of land at the Conquest. Colonel Smith says that the Flemish archives contain indications of the horses of that country having been conveyed to England during the Plantagenet dynasty.

The present large horses of the London brewers are bred chiefly in Yorkshire, Lincolnshire, and Staffordshire. Some fine animals are also bred in Northamptonshire. In this last-named county was bred that stupendous animal some time since exhibited in the Egyptian Hall, London, by the late Mr. Carter. The height of the Mammoth Horse, as this great animal was appropriately styled, was twenty hands (six feet eight inches) at the withers; and to the spectator standing on a chair, and looking down upon his back, it appeared as long and capacious as a ship's barge. His weight was 25 cwt.—*a ton and a quarter!* This horse was not clumsy; but, on the contrary, he was a grand, graceful, and noble-looking creature, quite free from vice, and as playful as a lamb. He is stated to have been produced by a cross between the old Cleveland and the Flanders stocks. The Irish brewers do not emulate the prodigious horses of their fraternity on this side of the channel. They can, however, show good, serviceable beasts under their drays,—beasts, it is true, of far less bulk than the London horses, but which would, nevertheless, press these gigantic animals very closely, were a trial of strength to be instituted between them anywhere but in the crowded streets of the metropolis.

For *farm use* cart horses should not be bred too heavy; for they will be found to retain an equal proportion of power if bred with a view to a moderate share of activity. The English farmers and owners who use horse-power, are often in error in employing such large and heavy animals. This system compels them to keep a greater number than they would otherwise require; and it should be recollected that every unnecessary or supernumerary horse kept upon a farm is just as much absolute loss of money as his support costs, and that cost need not necessarily consist of actual outlay. The *produce thus consumed* is to be regarded as so much money wasted. These great horses *cannot, besides, do their fair share of work.* They are too sluggish,—too lethargic; and hence agriculturists, who employ such, are obliged to work a greater number than, with proper management, *ought to be* necessary. It seems absurd, for instance, to see, in some of the English midland counties, three enormous horses drawing a *light plough* on *light soil*—a work that would be performed with ease by a *single horse*, or, at the utmost, a pair of the lighter breeds in general use in Scotland or Ireland.

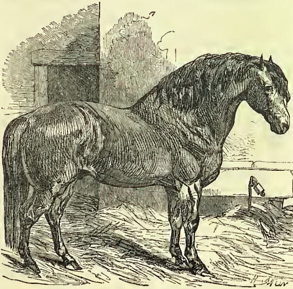
The *breeders* of cart horses, or those who wish to do so, must be governed in their operations by the description of *work* for which they design the animal. If the breeder live upon a light, sandy soil, a foal out of a Clydesdale mare, by a well-bred horse, will produce a



THE CLYDESDALE HORSE.

valuable animal, and one that can be worked up to six years old; by which time there will be another colt ready. The former may then be sold at a remunerative price. If he reside on a stronger soil, he must breed a heavier animal. In this case if he puts a Clydesdale stallion to a mare produced by a cross, such as has been described, he will have attained this end. But the breeder should bear in mind that nothing is more unsatisfactory, or so likely to turn out an unprofitable speculation, as breeding a nondescript—a brute fit neither for the carriage nor the plough—for the saddle nor the cart; and it is, with some few exceptions, within the power of the breeder, by a judicious selection of parents, to insure a *certain* offspring. Few things are more *certain* than horse-breeding; for the rule, "like produces like," in most cases holds good from generation to generation. In rearing foals, good feeding and warm housing are absolutely necessary during the first autumn and winter. It is during the first year that they are either made or marred. If starved or stinted by neglect during that period, abandon all expectation of seeing him a good horse, whatever has been his pedigree.

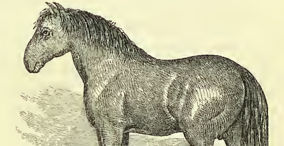
THE SUFFOLK PUNCH is a very useful horse for agricultural purposes; yellowish or sorrel coloured, with frequently a white *blaze* in the face, large head, wide between the ears, rather coarse muzzle, long and straight back, flat sides, low forehead, and shoulders rather


THE MODERN SUFFOLK PUNCH.

forward, high at the hips, round legs, short pasterns, deep-bellied, and full barrel, and usually 15 or 15½ hands high. This horse is certainly no great beauty, being deficient in several points of symmetry; he is, nevertheless, a hardy and useful horse, and capable of performing a greater amount of labour than many better-looking animals. He is also kindly disposed, and a good feeder, it being no ordinary fatigue that will suffice to put him against his manger.

In the foregoing description, it is necessary to state, that we had in our mind's eye the *original* Suffolk Punch horse, and not the modern-bred cart-horse of that county, of which the engraving on page 98 is a representation. The horse from which our drawing is taken was exhibited at a late Agricultural Show at Northampton.

The old Suffolk Punch was remarkable for the willingness and perseverance with which he would pull against a dead weight, even when he felt it could not be moved by his strength. The present breed seems to have been produced from a cross with the Norman stock. They stand higher, and are of lighter form. It is questionable how far they may be regarded as an improvement upon their predecessors. The old Punch breed brought very high prices. Mares



THE OLD SUFFOLK PUNCH.

with foals at foot have gone as high as 150 guineas; and 100 guineas was not a very extraordinary price for a stallion.

The present alteration in the form and size of the Suffolk horses is to be attributed to a cross with Yorkshire half-bred stallions. The result has been a larger race and higher fore-hand breed; but it is, as has been already remarked, questionable whether the animal maintains the valuable qualities of energy and temper that he formerly possessed.

Perhaps few horses are so generally useful for a farmer's purposes as those of Ireland. The cause of this has been already hinted at, viz., the custom of the farmers of that country to keep a mare or two, and give her a blood-horse when in season. Hence they have spirit and action combined with hardiness and endurance.

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CHAPTER X.

STABLE MANAGEMENT AND VENTILATION.

One of the most important matters, in the management of horses, is having a properly constructed and well arranged stable. It has more to do with health, with capability of work, and with the progressive value of the animals, than we can well imagine at first view.

Originally the stable was unknown. The horse, as with the Arab patriarch, would either roam in the fields or inclosures, or be sheltered in the hut or tent of its owner. As civilization advanced, he would have his own place of abode, and be kept separate, and hence a stable would be a place to answer the double end of confinement and shelter. Beyond this few parties even now give the matter a thought. If they can place their horse where they are sure to find him, and if he is only dry, or screened from the blast, it is sufficient. No provision is made for light, except the door of the stable, which is to be opened when the requirements of his attendants need the aid of light —no ventilation, except the crannies or fissures of the door, boards, and hay-loft—all of which are sometimes most carefully screened from tho air, when the horses most require it. No arrangements are supposed to be necessary for drainage. The litter is the sole mode of removing the absorbed urine and moisture. Nor are any pains taken to provide for a dry and comfortable habitation for this the best friend of man to be found among the brute creation. We may add that all these practices are carried on with impunity, and there is often less disease with them than there is with the utmost care in the hunting stable, where the horses are attended like children. How is this? The reason is obvious. The farm horse, to whose especial management a future chapter will be devoted, is a different sort of animal. He works much in the open air. He is subjected to vicissitudes of climate, very extreme;—wet, hot, or cold, he must go, or draw, or stand, as the different operations he is called upon to perform demand him to do. He has a long shaggy coat in winter,—a free open-air life, to overcome the deficiencies of the stable; and that is rarely so close as to do him much harm. But the horse constantly confined for days together must have different appliances, or he will die of inflammation of the lungs—he will become blind, or broken-winded, or lame!

The principles of ventilation have been, till lately, but ill understood. If we thoroughly ventilate we run the risk of increasing the cold atmosphere of the stable below the requisite point. Not that heat should be so great as to tender and starve the animal when he is turned out; for, though it is said to economize corn, and lay on flesh, to have the animal kept warm, still it may be carried to an improper excess. There is not generally sufficient discrimination exercised in the distinction between hot air and impure air. Hot air is not always impure; nor is cool air always innocuous. The fact is that, other things being equal, a cubic yard of hot air is certainly less nourishing than an equal quantity of cold air, because, being more rarefied, the former will, of necessity, contain less of the vivifying principle,—the oxygen. Pure atmospheric air ought to contain, in one hundred measures, seventy-three of nitrogen, and twenty-seven of oxygen nearly. There is usually more or less carbonic acid gas mixed with it—seldom as much, however, as one per cent. Now, the warmer the air in any confined place, the thinner it will become,—it will be rarefied. Hence, a stable filled with hot air will contain less oxygen than one containing cold, though neither the one nor the other may be absolutely impure. The operation of breathing destroys the oxygen, and leaves in its place a poisonous atmosphere,—one of carbonic acid gas. Now this is a heavy gas. It will remain at the bottom of the stable unless forced upwards; whereas, the vapour and hot air will always tend upwards, whether there is an aperture or not. So long, therefore, as the air in the stable and that of the atmosphere are of the same warmth, there will be little ventilation. It is the interchange from hot to cold which causes the principle to be set into operation to its fullest extent, and the most perfect ventilation of all is when the cold and pure air is admitted at the bottom of the building, and the hot air allowed to escape at the top. It is a mistake, also, to imagine that the foul air from a stable can possibly escape, unless fresh and purer air is allowed free access.

In buildings where ventilation is properly attended to, atmospheric air, warmed by artificial means, is forced into the room, and flues opened to admit of the escape of the vitiated atmosphere. This principle is adopted in the Houses of Parliament; but it is altogether inapplicable to stables,—though it is by no means a bad plan to have a hot water pipe pass through the stable, and to depend upon that rather than upon close rooms for the necessary heat; but to continue abundance of fresh air, by simple ventilation alone, should always be the rule.

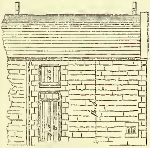
But how are draughts to be avoided? Will not the horse be killed, his coat become rough and staring, his comfort destroyed, if we let in too much air? There is, doubtless, danger of all these, if the ventilation is not properly managed. One of the best and most recent schemes is that of Mr. Green, of Newcastle, who prepared the plan for his Grace the Duke of Northumberland, and for which a prize was awarded him by the Northumberland Agricultural Society.

The main and the best feature of the plan is to give access to the external air precisely where it is wanted—*near the nostrils of the horse.*

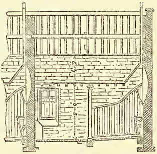
It will be interesting to give some description of these stables, as the architect designed them on strictly scientific principles, and they are, if not quite perfect, the most in keeping with the science of the present day, of anything we have met with, besides having obtained the favour of the Duke of Northumberland himself,—a practical man, and thoroughly capable of judging of the proper principles of construction.

All the walls are of stone; but this may be adopted or not, according to the circumstances of the locality. The dimensions of each stable are, eighteen feet long, twelve feet six inches wide, and nine feet seven inches high. Each stable is two-stalled—an excellent arrangement, for while each horse has company, he is not liable to the great variations of temperature necessarily arising from the constant influx and efflux of a stud of horses into one large stable. Neither is he subject to annoyance and want of rest if any one of a given number be restless or indisposed. An ample, though not too great an area is given,—for something like 1078 cubic feet space is allowed for each horse. The stalls slope one inch in the yard, and are paved with stones. A channel-stone is placed behind the horses, with a slope to one end of the stable; and there a grating is placed, with an effluvia trap; for the absence of this is one great cause of several of the diseases of the visual or respiratory organs. The effluvia of the stable is usually permitted to escape, while that of the drains or tank too frequently rush back in the most uninterrupted manner. The tank is outside, and the water conveyed to it by glazed earthenware pipes. The gangway behind the horses is flagged and grooved transversely, but still sloped to the channelled stone.

The mangers are thirty inches long, twelve inches deep, and twelve inches wide, and constructed either of iron or slate. The racks are iron, put closely together, and leave the wall at an inconsiderable angle, space being obtained by the hollowing out of the wall, to prevent the waste or spoiling of the hay. The hay-loft is above the stable, and the hay is to be put down a spout or box tube, the aperture of which closes with a slot to prevent the access of foul air to the loft or chamber. A small trap-door inside, or steps outside, is the only access permitted for the groom. The floor of the loft is grooved, with hoops inserted in the grooves, and painted or pitched below, and not underdrawn, which prevents the necessity for ceilings. The loft is five feet six inches high up to the tie beam, and ten feet six inches to the apex of the roof, and is lighted by rough plate glass, introduced into the slating. A weather-boarded door admits the hay from the outside to the loft, directly above the stable door; the stone head of



SIDE ELEVATION.

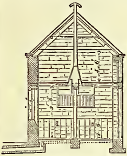


LONGITUDINAL SECTION.

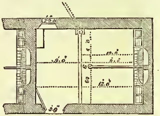
the latter being the sill of the former. The door into the stable is seven feet by three feet nine inches. The masonry of the door is clambered.

The preceding engravings represent the side elevation and longitudinal section of one stable and the gable end of another. At the right hand corner of the elevation a grating will be observed, about a foot and a half from the ground; and at a corresponding height in the section a small tube is seen under the manger. This is the perforated cast-iron pipe, afterwards described.

The next two engravings represent a transverse section, showing the ventilating-tube, which is placed over the centre, where the two stalls are divided, and a ground plan of the entire arrangements. Below the rack, boxes are provided to collect the hay-seeds, with openings to receive them, by putting deals in a sloping direction from under the manger. This prevents the horse from getting his head or fore legs under it. Over the horse, passing up between his head and the wall, is a ventilation-tube, for the escape of the impure air; it runs through the loft, passing off out of the roof above, the top of the tube being turned down, to prevent down-draughts. Besides the ventilating-tube, the section shows a hollow wall, connected with a grating, through which the air is diffused and the loft ventilated. The same grating communicates with a cast-iron tube, with small holes perforated on three-fourths of its surface only. Each end of this tube is bell-mouthed, and it is not perforated till the circular part commences. The openings on the outside, as we have seen, have cast-iron perforated gratings; so that the air is diffused before entering the tube, and small doors are provided, one or both of which may be closed when the wind is strong, or when, for any special reason, it may be wished they should be so. This perforated



TRANSVERSE SECTION.

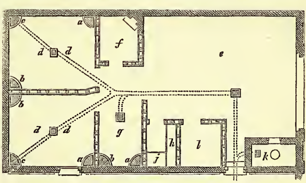


GROUND PLAN.

tube, coming directly opposite the horse's nostrils, supplies him with fresh air where it is wanted, and in such quantities only as it is required. The lights are placed behind the horses, and are provided for by a window glazed with rough plate glass.

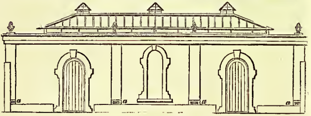
The system of ventilation, and the plan of building recommended by Mr. Green, to whom we are indebted for these details, is, he contends, one which gets rid of all foul air, however closely the stables may be shut up, and in which the same atmospheric air must gradually and imperceptibly diffuse itself through the stable, not in a current—as it would do if it came from behind—but the pure air *will* and *must* reach the animal's nostrils; and it is clear that if he gets it there it will be of the most service.

Among other efforts to improve the stable, both in ventilation and in its adaptation to the health and comfort of its inhabitants, we may mention a building erected by Mr. Murray Anderson, at his residence, Tollington Park, near London, and which, from its moderate size and convenient arrangements, promises to be a valuable model for imitation. We give a ground-plan and elevation of this, by Mr. Anderson's assistance. This plan embraces coach-house, stabling for three horses, and stable-yard,—all under one roof. The ground-plan exhibits the details of Mr. Anderson's arrangement; *d d* are two loose boxes, nine feet nine inches by eleven feet six inches; *g* is a stall, five feet six inches by nine feet; *f* is a harness-room, with a stove, four feet by six; *l*, a hay-shed; *h*, the corn-bin; *j*, a bin for beans; *e*, a covered yard, under which carriages may be cleaned and horses groomed in



GROUND-PLAN OF STABLE.

wet and frosty weather; *k*, the dung-pit. Mr. Anderson disapproves of racks for hay above the horse, as inconvenient to a tired horse, while the falling seeds are apt to blind him; hence, in one corner of his stalls he has a box, *a*, for corn, which may be of slate, iron, or enamel, while in the other corner, on the same level, he has a rack, *b*, for hay, with boxes underneath, to receive the seeds. In a third corner of the loose boxes, c, he has a vessel for water, of which there is a constant supply laid on from a tank in the room, and regulated by a ball-cock. The dung-pit is peculiar,—it is a tank, formed of cement, six feet by three, having an air-tight top, level with the floor, with a trap-door inside for throwing down the dung, and another outside in the road for its removal. In one corner is a grating through which the liquid passes off to the drain or liquid manure tank. From the centre a hollow tube rises to the roof and communicates with the external air. The lower part, within the tank, is perforated to within two feet of the level of the floor, and through these the noxious gases from the dung are drawn and carried at once into the atmosphere, where they are dispersed. The elevation requires little comment. It consists of a handsome brick building, in the front walls of which are four projecting square pillars; in each of which will be observed, about a foot and a half from the ground, a small square grating. These pillars are hollow, and in them rests Mr. Anderson's principle of ventilation. The pure air enters at this grating, ascends to the top of the hollow pillars, where there is a corresponding grating on the inside, and is gradually diffused throughout the stable and all the other parts of the building. In this way he provides for the admission of pure air.



FRONT ELEVATION OF STABLES.

It will be observed that about one half of the roof of the building forms a sky-light; the other, to the extent of a quarter of its space all round, being slated and ceiled in the usual way. In the sky-light are three ventilators, so arranged as to be opened more or less as occasion requires. These three ventilators are considered by Mr. Anderson amply sufficient to carry off all the unwholesome gases generated in the stable, the mere diffusion of pure air being sufficient to keep the stable pure and wholesome.

Another desideratum in stables is, that they should be thoroughly dry. A horse can no more live in a damp dwelling, without suffering, than a human being; and, if a stable be damp, a remedy should at once be provided. The general cause of dampness is bad drainage. The floor and walls give strong indications of what is going on below, and if this be so, a system of drainage, irrespective of the tank drains, should immediately be adopted. It seldom happens that dampness in a stable may not be cured by efficient drainage, and thorough ventilation. But the necessary drainage, Mr. Anderson contends, cannot be obtained merely by thorough under-drainage; it requires a concrete foundation, not only to the walls but to the whole structure; and on this system is his stable built; the concrete under the foundations being about a foot in depth; that under the rest of the stable six or eight inches. The floor of the entire building inclines slightly towards the centre, for the purpose of getting a sufficient fall for the drains. Mr. Anderson considers loose boxes the most desirable stabling for horses; therefore he has two of them, each nine feet nine inches by eleven feet six inches; the stall being of the usual dimensions. Hay and corn, he considers, cannot be properly kept over horses, however sweet the stable may be; therefore he has avoided any loft over his stables. With these arrangements, he laughs at carbonic gas, ammoniac smells, and all other evils horse-flesh is heir to, as altogether impossible in a well-ventilated stable.

If we were to be critical, we should object to two points in Mr. Anderson's otherwise most efficient arrangements. His harness-room is much too small to admit of harness being kept in it in high order. A door also appears to open into one of the loose boxes, which would seem objectionable; but Mr. Anderson explains, that it has a south aspect, and that it is divided into two halves, the upper of which may be opened on a warm sunny day, much to the benefit of a horse recovering from sickness.

Another friend, who takes great pleasure in having his horses properly lodged, has adopted what we think a most effective system of ventilation. The stable in question is for four horses. It is a brick building, of handsome elevation, with ample room in the stalls; all other arrangements being of the best description. The stable is lofty, not less than thirteen feet, properly ceiled, with hay-loft and corn-bin over it. Over each stall, at the height of twelve feet, is an opening for the admission of air, with an iron grating outside of each, and a slide within, by which the groom arranges according to the temperature required. On the opposite side, behind the horses, and about five feet from the ground, is another slide, also communicating with the outer air by means of a hollow wall, having a grating about a foot from the ground; this diffuses fresh air among the heavier gases generated in the stables, and can also be regulated so as to avoid any injurious draught. Moreover, the air admitted here has the advantage of being somewhat tempered; the wall through which it reaches the stable being protected by a slated shed or pent-house for cleaning the horses under in wet weather. Over each stall, and opposite to the opening in the front wall, is placed a ventilating-tube of the usual construction opening on the roof, which carries off the foul air. This stable, with its appointments, is an excellent model, and is altogether free from smell at any time. We should add that although it has a hay-loft over it, the hay is only admitted to the rack by a slot which closes and shuts off all smell, or breath of the horses. The floor of a stall should not slope more than is absolutely necessary to carry off the superfluous moisture; if the declivity be too great, the flexor tendons of both fore and hind legs may be kept on a constant stretch, to the certain injury of the horse; but this seldom happens. The floor of the stalls should also be so paved at to furnish a fulcrum for the horses' feet, both in rising and laying down. Nothing can be worse than a smooth bed, on a declivity of one inch in thirty-six. The horse is certain to be injured in his efforts to raise himself on it. The best floor for a stable is one paved with small round stones from three to four inches in diameter—the interstices filled up with gravel.

Much of the ophthalmia prevalent among horses is caused by the ammonia given off by the urine and droppings, but more especially by the former. This is to be dissipated by ventilation; but it may be absorbed by sulphate of lime or gypsum, as also by muriatic acid. Peat charcoal, spread under the litter, not only removes all smell, by fixing and deoderizing the ammonia, but it forms a most excellent and efficacious manure. Many farmers conceive that *darkness* is an advantage to the stable, inasmuch as it induces bad feeders to eat. Perhaps they are not aware that darkness is one of the most frequent causes of *early blindness;* or, at least, of considerable injury to the sight. Hence, also, a very frequent orign of *stumbling* and *starting*—two faults of a most unpleasant character.

A loose box or two are a very useful, nay, necessary appendage to every stable. In building a new stable, indeed, as we have seen in Mr. Anderson's case, every stall may be convertible, in a few minutes, into one. The box is most useful for a fagged and jaded horse, for it encourages him to lie down and rest; and to the idle horse, for it induces him to walk about, amuse, and exercise himself. A box at some distance from the stable is useful in case of contagious or infectious disease. It is also useful as permitting of more variations of temperature than the ordinary stable, and into this—cooled down as nearly as possible to the temperature of the external air—should every horse just taken from grass be put, ere being removed into the warm stable; and, *vice versa*, ere being turned out of the warm stable to grass, in spring or summer. Such a system of management would prevent the accession of many a cold.

The ordinary practice of limiting the allowance of water is both inhuman and contrary to common sense. Nature never errs; and if water be left to the horse's own discretion, he will only take as much as is good for him. We may attribute to this curtailment of water many of the diseases of the horse—as slow fevers, glanders, nasal catarrh, &c. When a horse is warm with violent exertion, the chill had better be taken of,—not by letting the water lie in the stable, but by adding a little warm water to it. In well-conducted racing-stables water is given to the horses so frequently that they will drink but little at a time. Surely this is better than keeping them so long without water that when it is given to them they will fill themselves to repletion.

The description of water a horse has given him to drink has much to do with his appearance and health. Cleanly as that animal is, we often see him prefer the stagnant soft water horse-pond, to the cold spring water of the pump-trough, or the pellucid stream from a bubbling spring. Nature teaches him best. Soft water is more healthy than hard; in other words, the rain water, with all its atmospheric impurities, and often with much decayed vegetable matter, is preferred to the water highly charged with mineral ingredients, as spring water generally is found to be. It must be admitted, however, that whatever the natural preference may be, the habit of drinking the hardest water may be acquired; and after this is so, no difference in the health or appearance can be discovered. If it is wished to soften the water it can be boiled.

When the horse is at hard work, and much heated, a mouthful of water, a gulp or two, will be the most reviving aliment. It is a bad practice to allow the water to stand all night in the pails in the stable. If too cold it should at once be made tepid, not in the absurd way it usually is—which destroys the tone of the horse's stomach—by adding quantities of hot-water, but by simply adding a pint of boiling water to about two gallons of cold.

There are times when the groom may find it necessary to restrict the allowance of water. To give a large pailful to a horse before a hard gallop would endanger his wind, and injure the animal. He would ride sluggishly and heavily, and unpleasantly. But the thirst should be satisfied. This is easily done by an expert groom. He will give him small quantities at distant intervals; and thus the horse will get sufficient, without loading the stomach or interfering with his work. But habitual restriction is the cause of the very injury complained of by the excess of water. The constant denial begets a longing for it, which, when full liberty to use it occurs, induces a voracity that ruins the horse. A little management and a little trouble will obviate all these inconveniences. A groom who pinches his horse of water is often a lover of *drink* himself, who is not careful enough to give his horse water frequently, and unwilling to satisfy him when he gives it but seldom! A good groom will never have a regularly kept horse in a condition so thirsty as to be injured by water.

The *quality* of the water is also of primary importance! It should be pure, fresh, and sweet. Do not let *nitre* be mixed with it, unless when required as medicine,—a very common practice amongst ignorant grooms, and occasionally even advocated by those who should know better.

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CHAPTER XI.

GROOMING AND DRESSING.

THERE is, both in the human system and in the whole mammalian race, a wonderful sympathy between the vital organs and the skin. Between the lungs, especially, and the whole surface of the skin, the most astonishing connexion evidently exists. Thus obstructed perspiration by a draught, on a small portion of the skin, will induce a cough in the lungs, which is a sign of functional derangement. Formerly this was believed to be mere sympathy between the internal organization and the vital viscera. But the recent discoveries of physiological science attributed it to a more intimate connexion. The lungs are found to be organs for burning the carbon, the fuel-food, and so to keep up animal heat; but there is another combustible element taken in, some of which passes off on the same element in which it entered, but the rest of which is consumed in the system. That element is hydrogen, one of the components of the water and aqueous matter taken into the system. This is burned by the atmospheric oxygen at the skin, in the same manner as the carbon is in the lungs; and hence, when the skin is not properly performing its functions, the extra labour of the lungs produces derangement. Hence the necessity of grooming. It is not the glossy coat, as such, which is to be prized. Malt, or balls, or heat, will obtain it. But "elbow grease" alone will give the animal the proper and healthy coat.

The ordinary farm-horse, at work all day and turned out at night, requires little more grooming than a rub down with a wisp of straw, and the removal of mud and dirt from his limbs. Hardiness is necessary to the existence of this horse, and a regular system of grooming would only render the skin too sensitive, and the horse more susceptible of cold. But it is of the *stable* and the stabled horse that we are more immediately treating, and it is to him—deprived, as he is, to a great extent, of exercise—that grooming is most necessary, in order to cleanse away the scurf that obstructs the pores, to admit of free perspiration, and promote circulation towards the extremities.

In grooming a horse, the operator is provided with a currycomb, a brush, and a wisp. To this may be added a small knife, adapted for dressing. The first named is calculated to scratch off any dirt or perspiration which may have accumulated by exercise or work, and in horses recently taken up it is also useful in separating clotted hair, and even reducing or cutting its dimensions. It is an instrument to be used with great care and caution. It may scratch the skin, and easily be very injurious to the horse. It is an operation which must be considered as only to be occasionally adopted, and then with nicety and gentleness, slowly and delicately passing over the hair.

The *brush* is the sheet-anchor of the groom, and the currycomb is often best used in cleaning the brush. The stabled horse has a growing accumulation of scurf at the roots of the hair. This the brush is intended to remove; by passing between every hair it separates tho smallest particles, and brings them to the surface.

The *wisp* is then in its proper vocation. It removes the scurfy and dusty particles from the surface. The *comb* sharpens and cleans the mane and tail, which sometimes require wetting to be made to lie properly, and the sponge washes out the feet and hoofs. With these a good groom will not only have a glossy coat, but—what is far preferable—a clean skin for his horse.

There are two ways by which a fine, glossy coat may be produced, viz., by heat and by dressing. The former produces it at the expense of the animal health; the latter in a manner highly conducive to health. The proprietor should, therefore, see that the fine coat of his hunter or riding-horse is produced by fair, honest rubbing, and the free use of the brush, and not by heated stabling and warm sheeting. Horses should, as a matter of course, be dressed every morning; the cleaning they receive after work is quite an extra matter. With horses that possess a very tender skin, the use of the currycomb should be dispensed with, and the *brush* or *haircloth glove* substituted for it. If you wish to ascertain whether or not your horse has been properly dressed, rub his coat with one of your fingers; and if a *greasy stain* be present, your groom has slurred over his task.

After work a more determined course has to be pursued; the horse should be rubbed over. It is much easier to drive the horse through a pond or stream, or even to dash a few pails of water over the parts most likely to be dirty, or most troublesome to clean. This is slovenly, and not altogether free from danger. Evaporation will set in at a fearful rate, and, if speedy steps are not taken to keep up the circulation, mischief may soon be expected to follow.

It is not desirable to dress horses in the stable, especially if several are in the same place. They may generally be taken out of doors with great advantage, when the dust and dirt will escape freely. But one of the best contrivances we have seen is a *horse-cleaning house*, conveniently situated at the junction of two lines of stabling, and belonging to George Crowe, Esq., of Ornhams, near Borobridge. Here the horse can be cleaned in the air, and still sheltered if the weather be cold or rainy. Another side-box might be adapted to this purpose, in many establishments, with very great advantage.

It is in winter that the neglect of grooming, or its slovenly performance, will produce the worst effects on the horse, and with the greatest rapidity. On a horse coming in, in dirty weather, the mud should be first removed. This is usually done in two ways—first, by scraping it away with the sweat-knife, and finishing with the wisp and brush; secondly, by *washing* it away. The best mode of doing it, however, is first of all to remove all the mud and loose water, by the aid of the knife; and then, should the horse be warm, walk him about for a quarter of an hour or so; then use the *wisp*, and rub him dry; wash the feet and legs, pick the soles, look at the shoes, rub the feet and legs *dry*. This is a most important consideration, and one that is generally too much neglected; hence giving rise to many severe colds, inflammations, and often *grease*. Comb the mane and tail. These operations are terminated by a careful finishing with dry wisps.

When a horse is quickly and effectually dried in the manner we have detailed, there is not the slightest danger of his catching cold; but there may occur (in very rare instances certainly, but still there *may* occur) cases where the horse cannot be thus groomed, but must be put up in the wet state in which he came off the road.

In these cases we resort to *clothing*. This is *never* to be resorted to where it is possible to groom, and is on no account to be regarded as offering a substitute for manual friction; it is to be considered as a mere expedient—a *last resource*, better than absolute neglect. It may, however, be well to know that such a resource exists. The object of clothing, and the manner in which it acts as a preventive against a wet or over-heated horse catching cold, are as follow: cold is caught in consequence of the sudden cooling down of the body at the surface, producing increased action of the respiratory and vasculatory system, in order to supply the deficiency of animal heat thus produced. Inflammation of those organs, or some portion of their attendant apparatus, consequently takes place. The cooling of the surface is caused by the evaporation. The more rapid the evaporation, the more sudden and severe the chill. The clothing then acts, by preventing or retarding evaporation. The horse consequently loses heat so slowly that his natural vigour is able to keep up the necessary supply—in short, he *never becomes chilled*. The clothing should be woollen, and thrown loosely over the body,—it then absorbs some of the superfluous moisture,—not strapped down upon it, as that is apt to excite undue perspiration.

A somewhat modern invention, to dispense with some of the labour of the groom, is the operation of *clipping*. The coat of the horse naturally lengthens in winter, to protect him from the low temperature of that season, and drops off or moults in the spring. Now grooming is to give the horse in winter his summer coat; and clipping is a ready way of jumping to this condition. The operation is usually performed by a professed clipper, and is a work of too much nicety and skill to be performed by the ordinary groom. Great care to prevent exposure and wet is necessary at first; and for some time he must not stand still, and should be clothed when taking exercise on cold or damp days. With the wonderful plasticity which nature displays in all her operations, he is soon fit for ordinary work, and a vast amount of labour is saved to the groom after clipping. He is free from the hair which takes so much rubbing dry. A wisp or a soft broom will soon bring off all the dirt and sweat without the currycomb; and if half an hour was necessary to dry his coat before, fifteen minutes will now suffice. A greater degree of energy and activity are necessary, in grooming, after clipping than before. There must be no dallying—no half work. The horse must be actively groomed at once; or his fate is sealed for an attack of cold or of distemper.

The objections to clipping arise more from the extra care and attention required *after* the process, than any direct injury inflicted on the animal *per se;* but it must not be forgotten, that the same neglect which induces a long coat of hair will sometimes also operate in producing injury by cold afterwards. All horses are more or less liable to injury from cold. To be sure, some horses will constantly be seen exposed to all the severity of the most inclement weather, and yet escape. Such have been probably gradually inured to exposure; and the power of the animal system to accommodate itself to circumstances is very great; but surely a little trouble is preferable to great risk, especially when valuable horses are concerned. A wet horse requires most care when he has been *heated by his work.* The reader has probably experienced this in his own person; after copiously perspiring he has felt cold and shivering, even though his skin be at the time quite dry. So it is with the horse. Before he has been heated he might stand in the cold, or with his coat wet, for perhaps half-an-hour, without experiencing any ill effects; but, after perspiring pretty freely from exertion, exposure to a cold atmosphere for fifteen minutes without exercise will do him more mischief than similar exposure for an hour would have caused him before the exertion.

When a horse has contracted injury from exposure, the first symptom is generally a *staring of the coat.* When this is perceived, let the animal at once be put into a warm stable, and warmly clothed; or, if the weather be favourable, let him be at once put into motion. Your object is to restore the vital heat—to produce a healthy reaction in place of chilliness and prostration. If *shivering,* which next shows itself, should superveno, you will have to administer hot drink, and to clothe the horse with flannel sheeting, previously *warmed.*

Friction with the hair-glove, in the *warm stable*, especially under the belly and behind the joints, will be useful; but in all probability it is too late, and inflammatory action has set in.

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CHAPTER XII.

MANAGEMENT OF FARM HORSES.

Of late years this subject has received great attention from the different agricultural societies, and some valuable essays have made their appearance. The one from the pen of Professor Spooner may be supposed to possess the highest authority, as it has received the sanction of the Royal Agricultural Society. To this essay, therefore, we shall look for a synopsis of our present knowledge of the subject, without being disposed, at the same time, to agree to all that he asserts.

Great difference of opinion exists on the question whether farm-horses should be kept in the stable, or in the open air, during the summer months. During the winter months, or from October to May, there can be no question that all horses should be housed; and yet we know farmers, and good ones too, who pursue a contrary practice, and turn their horses out all winter. They give them an open yard to roam about, and an open stable where they may take shelter when they please. This is leaving the horse to select his own comfort; but though instinct teaches all animals, in a state of nature, to avoid what is injurious to health, we doubt if animals in the domesticated state possess these instincts sufficiently powerful for the purpose. But suppose this objection overcome, that of allowing several horses to herd together in a confined space remains. They will invariably harass and hamper each other, and a master horse will probably select the stable door to stand in for shelter in a storm, and thus keep all the others exposed to its pitiless pelting.

Professor Spooner thus expresses himself on this subject:—"During eight months of the year, viz., from October to June, there can scarcely be a doubt that it is desirable in every respect to keep horses in the stable. The effect of exposure to the cold and wet during this period is indeed tantamount to the waste of so many quarters of oats; for if the animal heat is permitted to be thus purloined by means of exposure, an additional quantity of fuel, in the form of food, becomes necessary to supply the deprivation; for there is no fact in animal chemistry better established than this, that the principal use of the non-nitrogenized or carbonaceous part of food, is to furnish a supply of carbon, which, uniting with the oxygen of the atmosphere in the lungs, gives out heat as in ordinary combustion, and thus serves to keep the animal temperature above that of surrounding objects. It is, therefore, a very costly method of procuring a certain amount of animal heat, when such heat, or a good portion of it, can be retained by keeping our animal in a comfortable stable. Besides which, the effect of turning a horse into the open air is to cause him to have a long thick coat,—this being one of Nature's resources to counteract the effects of cold. When a horse is worked with such an external covering, he sweats readily and profusely in consequence, and is faint and weak after very little exertion. Thus, in whatever way we look at the question of turning out, it is decidedly objectionable in every respect."

Such is the Professor's opinion on the question of turning out in winter,—an opinion to which we cordially assent; but it must be understood that a clean, well-ventilated, and moderately warm stable is required. We consider any system preferable to shutting up horses in close, suffocating, oven-like stables, such as some of our modern erections are, and prefer much the old-fashioned farm stable, full of crevices and crannies, where we find ventilation and pure air; for if the wind does sometimes whistle through it, the farm-horse, after all, has to bear many a blast out of doors from which there is no escape. He has to cart turnips in a cold bleak December morning, and to wait in the cold till his load is full! From which stable is he likely to suffer most,—the close, pent-up, unventilated one, or the free, airy, perhaps cold and windy one? If accustomed to the latter, he has his coating and system prepared for his work; if the former, severe injury is inevitable.

So much for turning out in winter. But a middle course is sometimes adopted. Mr. Lawrence, of Cirencester, a gentleman who carries out to the letter every suggested improvement, has adopted stalls capable of being made into loose boxes. At the head of the stable, before the stalls, is a passage, which communicates with the rack and manger, so that they can be fed either with chopped straw or hay from the head, without at all approaching the heels. At the end of the partition of each stall is a gate which will shut the stall entirely up, or will fasten to the wall, hanging on a square, so as to adapt itself to either position. The horse is therefore in a loose box, all inclosed, and can take any position he pleases, while the gates will either all shut, and leave a passage behind every horse, or will attach to the wall at the end of each stall, and so double its size, giving ample room for the horse to turn or lie at pleasure. He is also bedded with cut or chopped straw. The manure is well made by this system; but there is some difficulty in keeping the horses so clean as when they are tied by the head, as they are left to select their own bed when loose. Still these objections may be obviated, and there can be little doubt that if well cleaned out, as they are at Cirencester, the horses live in much greater comfort than where they are tied by the head; they have also better access to the air, and are generally more at liberty, without any danger of interference with each other, than when confined by the head.

But as regards the summer soiling of horses—that is, the keeping in the horse all the year round—a somewhat different principle applies. While nobody would urge dry food, perhaps, for farm-horses in the summer months, there are those who would soil with green food even then. They have good show of reason for the practice. They allege, with truth, that it saves the horses a vast deal of labour. The draught horse works hard and long; he has not too much time, it must be confessed, in summer, either for rest or feeding, and if he has to roam about for his food, it is so much abstracted from his necessary rest. He has, in addition to his field-work, to work for his own subsistence—to cut and chew his food—and to wander about searching for it; whereas, in soiling, the scythe takes the place of the horse's head, and the cutter of his teeth, and he is resting even while eating his meal. Again, they allege there is a vast saving of manure. Not only, it is said, will the dung waste and evaporate, but the caustic urine will burn up the grass, and do absolute injury instead of good; that the flies and insects are extremely teasing and troublesome; and that the only satisfactory mode of feeding is to soil in the house in summer, as well as in winter. Nay more, it is urged that they are always at hand for use—that they have no distance to travel to pasture—that the great mass of straw turned into manure in summer will repay for the extra labour of cutting and carting the green food on which they are kept—and that there will also be an economy of food in this mode of consumption.

These are reasons which appear very weighty; and yet there are, as in most cases, two sides even to this question. The first objection is the expense of carting the whole of the food for a great number of draught horses. The mowing, the gathering, the carting, the strewing, the cutting, together with the danger of fermentation and spoiling, are amongst the objections to the practice. Then a close stable in summer is pestiferous. The air of heaven is sweet and delightful, but the stable in hot weather is a sink or pest-house. Unwholesome vapours, hot air, rapid decomposition of fæcal and urinal matter, and the smells of putrefying vegetation are such as must interfere with both health and comfort, and even with life. The horses are never cool. They are subjected, after a hard day's work, to the oppression of a night's confinement in a close, ill-ventilated stable.

For turning out in the summer months, Professor Spooner gives a decided preference. He states its advantages to be a saving of litter; as well as a saving of labour, in carting to the stable. The coolness of the pastures during the night, as compared with the heated stables, is, he considers, very conducive to health, and flesh is generally gained at this period. The loss of dung may be obviated, he observes, by employing a lad with a wheelbarrow and shovel to collect the droppings from time to time into a heap, to be afterwards mixed for a compost. He well remarks, moreover, that this exposure is not to be stretched too far. "When the nights get cold, and before the moulting season sets in, the horses should be no longer turned out at night; but the change may be rendered gradual by letting them out a couple of hours in the afternoon, after the day's work is over."

To begin with the farm-horse, which is supposed to have been house-kept from October to the 20th of May, if the weather be mild and genial, or till the 27th if otherwise,—but now he is to be turned out. For this purpose, it is presumed that a proper pasture has been reserved, having a full bite, at least six inches long, of the red and white clovers, with stubble or rye-grass, and perhaps a little trefoil mixed with the natural grasses, according to the character and condition of the soil.

The day selected for turning out should be a Saturday. At noon of that day an extra feed of corn should be given them, to mitigate the appetite with which they attack the young grass; and about seven o'clock in the evening they should be turned into their pasture, on which they will eagerly feed till the morning. If now put to work with a full stomach, and before the dry hard food of the previous day has passed through them, injury may be done. For this reason, Sunday, which is usually a day of rest to the farm-horse, is recommended for this great change in their diet. The appetite for the fresh grass is appeased—the day's rest facilitates digestion. With these precautions, and on good sweet pasture, the new food is assimilated, and the change is completed without injury.

When the weather is wet and cold a little shelter must be afforded, but no recurrence to dry food, when the horses are either turned out for the summer, or where soiling with green food is adopted. When the pasture is too distant, a feed of crushed oats may be given at noon; but it is more usual so to arrange matters that the pasture is chosen near to the fields where the horses are at work. At noon, when this is the case, the horses are unharnessed and turned loose to feed for an hour or an hour and a half, while the workers have dinner. During turnip-sowing, and seed and harvest-time, when the horses have very long hours, it is by no means a bad practice to soil the food altogether, giving only a feed of crushed oats with their ordinary food. Both the green food and the crushed oats are highly nutritious, soon swallowed, and easily digested,—an advantage at this season when time is precious. In such times of hurry, however, we much prefer leaving the horse to his cut tares or clover placed before him in the cart, or, if ploughing, with his nose-bag during the dinner-hour. With this liberal treatment, it is impossible to estimate the vast amount of work a horse will get through, or its value during the time of turnip-sowing, which is often a dry season.

The pasture usually fails a little in August, and in September the second crop of red clover supplies its place. Where sheep are kept, it is an excellent plan to mix the stock as much as possible—keeping in mind, however, that the pasture must always be kept good. If a closely eaten seed field is now and then freed from all stock, the grasses will spring up young and smart, and this constant change of pasture has a beneficial effect on the health and comfort of all classes of animals.

It is desirable to save a supply of rich clover, or of winter and spring tares in succession, for the soiling of the horses at noon in very busy periods. The last-named food is excellent to put before the horses in harvest, when carting corn. On these they will work for an incredibly long period. Their succulency will afford the requisite moisture; and the animals will obtain rest enough while they are standing, especially if the owners take the precaution of placing a stilt under the cart shafts, during the time the cart is being loaded.

In September or October, according to the state of the work, of the pasture, and of the weather, the horses should be again taken into the stables. By this time the second crop of clover will be exhausted. But ploughing, stubble-clearing, and other autumn operations, will be in rapid progress, and extra work requires extra food. At this time, therefore, chopped clover, crushed oats, and split beans will afford solid nourishment, and supply the deficiencies of the grasses, which at this season are of a soft and watery nature. The least indication of frost should be a signal for taking them into the stable, at least during the nights; and, as this change is one of very considerable magnitude, there should be a little preparation. The rapid change from soft, wet, or succulent, to totally dry food, is sometimes too much for the digestive organs; and horses at this season have frequently attacks of dyspepsia—sometimes mistaken for cholic; and a false treatment is often adopted, which causes inflammation, and death frequently supervenes.

We object *in toto* to the drenching and quacking of horses in good health, as a general rule. To give physic or a staling ball in the spring and autumn, and even to bleed, without reason, all the farm horses in a stable, is a plan as absurd as it is objectionable. It is weakening and dangerous to the animals, and involves trouble and mischief at every step. But as the change is mainly one of diet, so it may be remedied by simple dietetic treatment. The horses should have at first two large bran mashes per day. If a handful of linseed meal is added to each mash it will be a very great advantage, both in a medicinal and nutritive point of view. Some persons add a little saltpetre or resin; and, if it amuse them to do so, there can be little objection, if the quantity do not exceed a few drachms. But all such alteratives, as they are called, must be speedily dropped. Two or three days should satisfy the most determined quack. To these mashes should be added two liberal feeds of roots. At this period it is of less consequence whether these roots be carrots, white turnips, or swedes. They all serve the useful purpose of supplying succulent food, and thus simplifying the transition from green food to dry.

But how are farm horses to be fed in winter? This is the great problem. It is a question of cost as well as of physical economy. What will keep them most healthy and fittest for work? The most straightforward of all modes is simply to dry the grass in summer, and thus preserve it in winter—in the shape of hay. It is, however of all methods, the most costly. It involves a very great expenditure of land for the winter keep of the horses, to which must be added the rates, tithes, taxes, and cost of mowing, winning, stacking, thatching, &c., which will amount to little less than 15s. per acre. This the farmer cannot afford. His horse has but little work in winter; and therefore he must be kept on a cheaper food than the grass of summer, with the additional cost of preservation added. Food for the horse must have bulk as well as chemical properties. He will *live* on a very small amount of concentrated food. The late Mr. Lumley Kettlewell, of York—an eccentric gentleman of fortune—made a great many philosophical experiments on the effects of different kinds of food on horses of various kinds, especially blood stock, with a view to reduce the quantum of bulky food, and to substitute cheap nutriment in an almost infinitesimal form. Many of his experiments failed, and the vulgar prejudices of the day attributed death by starvation to many of the animals on which he experimented. He established the fact, however, that for a very considerable time a horse would live on a pound of sugar per day. Had he added nitrogenous food—the element of flesh—in small quantities, it is probable his experiments would have been more successful. His sudden death prevented any matured result of these costly experiments from being published.

To sustain health, there must be bulk to extend the walls of the stomach, as well as nutritive aliment to supply the waste of heat, fat, muscle, and bone. It is a mistaken economy, therefore, to pinch animals of their necessary food, at any season of the year. Professor Spooner well says, speaking of the advantages of keeping horses in good condition, "that *two* horses *well fed* will do the labour of *three* horses *badly kept*." Nor will there be the absolute saving of food. A hungry horse devours and bolts great quantities of his food, without the mastication which will be given by better fed horses. What, then, is the best food for horses? With oats at twelve to fifteen shillings per quarter, nothing else is so cheap. They cost little more per stone than hay, and are much more nutritious. Oats and straw, if the former is given in proper quantity, will be an ample food for the draught-horse for five of the winter months, when the labour is seldom very severe. To this may be added, as a sanitary measure, either carrots, common turnips, or swedes. Carrots stand, perhaps, first on the list, and swede turnips the next. When horses are doing little work, either of these will be found a valuable addition to straw. By keeping the bowels in a healthy and active state, they promote health, and prevent grease and humours.

Next arises the question of chopping. There are few agricultural authorities who do not contend for this process. They allege that it saves the horse the *time* and *labour* of chewing the bulky portion of his food, and, by lessening his labour, gives him more time for rest and sleep; while the mixture of corn with the straw compels him so far to chew and masticate, as to ensure his crushing the whole of the oats. Nay, more, that as oat sheaves can be chopped without thrashing at all, this saving will more than compensate for the expense of chopping.

To this it is objected that no man who chops his sheaves knows what he is doing. He cannot determine the quantity of *corn* he is giving to his animals in proportion to the straw; nor can he tell the yield per acre of his oats—which is a further difficulty. And as the horse can have *no* oats or other concentrated food in this chopping system, especially when the crop of oats has been good, and the straw bears a large proportion to the corn, it is highly objectionable, and defeats the very object it purposes to cure, namely, saving the time and labour of the horse.

Oats, at present prices, are the cheapest food for farm horses; and, if crushed, there is no danger of loss for want of proper mastication. To give a comparative estimate of the cost of the nutritive matters of hay, as compared with oats, it will stand thus :—

100 lbs of clover hay contains—

Of respiratory elements .	40 lbs. of starch, gum, and sugar, &c
.. ..	4 lbs. of fat.
Of nutritive elements .	9 lbs. of albumen, gluten, &c.

Taking the first at one penny per lb. and the last named at three halfpence per lb., the 100 lbs. will be worth 4s. 9d. The value of the hay will come to about £5 12s. 6d. per ton. Now if, in juxtaposition to this, we take oats, they contain in 100 lbs.—

Of respiratory elements .	46 lbs. of starch, gum, sugar.
.. .. .	5 lbs. of fat.
Of nutrive elements .	11 of albumen, gluten, &c.

Reckoning the two first at one penny per lb. and the latter at three halfpence, we have the 100 lbs. worth 5s. 2d.; so that, if a bushel weigh even as little as 37 lbs., oats are as well worth, for nutritive purposes, 20s. per quarter, as hay is worth £5 12s. 6d. per ton.

In the wintry months—till preparation for the spring seed time commences—straw, it has been said, is all that draught horses will be found to require. But, as the work becomes harder, the days longer, and the seasons of entire rest fewer, clover may with great advantage be added instead of straw; and this must be given till the horses are again turned out to grass. In some seasons, when barley, stone for stone, is cheaper than oats, we have partially substituted it for the more usual and fashionable grain, and, up to a certain point, it may be advantageously given. As it requires much more maceration, it is absolutely necessary to crush it before it is supplied, and great caution will be required not to exceed the proper quantity. Barley is stimulative and heating; and if it is the only corn the horse is supplied with (that is, as the staple of food, straw being the remaining pabulum), a mixture of bran and a very liberal supply of roots will be absolutely necessary with it.

Great advocacy was at one time used for cooked food for horses, and especially steamed hay. It was urged that the process rendered the hay more digestible,—that it worked a change so extraordinary that the mouldiest hay would, after the steaming process, become nourishing and wholesome. The experiments of the Highland Society, however, did much to dispel this delusion; and steaming horses' food is now very generally abandoned. It is neither uncommon nor unwise, when barley is selling at a lower relative price than oats, to give the horses a portion each per day of boiled barley. It is thus cooked:—The barley is placed in a furnace or boiler, with water just sufficient to cover it. It is closely covered up, and fire is then carefully applied. As soon as it boils, the fire is allowed to die out, and the barley will be found to be soft and swollen, and to have absorbed the whole of the water. The barley will have increased, in four hours, nearly fifty per cent. in bulk. When given to the horses a little salt is added. They cannot have a more palatable and grateful food after a hard day's work.

Recent experiments with *linseed* have a little revived the question of feeding horses with cooked food. The vast power of the linseed in developing its extraordinary mucilaginous particles, by the application of heat, is a very peculiar quality; and it is known, by recent experiments, that horses can do any amount of ordinary work on linseed compound alone, with roots, without either clover, hay, or corn. The compound is very similar to that spoken of in the editor's work on "The Cow," belonging to this series of Handbooks, and is one of the cheapest modes of keeping horses in winter; their health keeping pace with their power and strength.

Thrice a-day the horses have a feed consisting of 2 lbs. of linseed meal, 2 lbs. of barley meal, 1 bushel of chaff, 1 gallon of water. The meal is boiled in the water, and poured upon the chaff. They have also a full feed of roots per day, say 40 lbs.; and on this, with barley and straw, the horses will remain in most excellent condition.

The cost of keeping farm horses varies more than may be imagined. The great amount a farmer pays for horse-keep, ought to make horse flesh the most valuable of all his property. But he is rarely aware of this. He calculates only his outlay. The oats, the roots, the clover, the grass, are *his own* produce; and he never calculates that they could be sold for money. The editor once hinted to a farmer who kept twenty horses for his farm, his riding, and for breeding, that they cost him £400 per annum, and he stood aghast! But he kept them for no such money.

Writers on horse-keep make sad mistakes. Otherwise, it is impossible the estimates could vary from £20 to as high as £40 per annum for draught-horses. One element of error consists in valuing the straw consumed by horses. Professor Spooner falls into this error. Now, though it is perfectly true that a farmer might often sell his straw, yet, generally, he is prevented by his covenants from doing so. He has more difficulty, moreover, in disposing of his excess of straw than in supplying deficiency; and it is by no means uncommon to send the straw to a distance of several miles, receiving nothing but the manure it makes in return, and even this has to be carted back at a great expense. Hence all calculations of cost should have this item omitted. Nor will the present prices of produce be forgotten in estimating the value of horse-keep. To give a few samples of the cost of keeping farm-horses by two or three methods, the following may be selected:—

	£	*s.*	*d.*
12 weeks, from November to February :—			
Oats, 2 bushels, at 16s. per qr., per week, 4s.; Swedes, 42lbs., 3d.	2	11	0
20 weeks, up to turning out, and in wheat seed-time :—			
Oats, 2 bushels, at 16s., 4s.; Beans, 1½ pecks, at 1s., 1s. 6d.; Clover, 8 stones, 4s. 6d.	10	0	0
20 weeks good pasture, and second crop of clover, at 6s.	6	0	0
Extra corn and mash, say	1	10	0
	£20	1	0

This is exclusive of attendance, as the carter or the ploughman, on farms, attends to his own horses as a part of his day's work, and therefore it is not calculated.

The soiling system, when adopted, is thus made out:—

1st quarter :—	Per week.					
	£	*s.*	*d.*	£	*s.*	*d.*
1½ bushels of oats, at 2s.	0	3	0			
1 peck of beans	0	1	0			
1 cart of cut hay	0	4	6			
	£0	8	6	5	10	6
				£5	10	6

	Per week.	£ s. d.
Brought over		5 10 6
2nd quarter :—		
2 bushels of oats, at 2s.	0 4 0	
1 peck of beans	0 1 0	
1 cart of cut clover hay	0 4 6	
	£0 9 6	6 3 6
3rd quarter :—		
1 bushel of oats	0 2 0	
Cut clover, 51 stone, at 1¾d.	0 6 4	
	£0 8 4	5 8 4
4th quarter :—		
1 bushel of oats	0 2 0	
1 cart cut clover	0 4 6	
	£0 6 6	4 4 6
		£21 6 10

The keep for the first quarter is by far too low, and at least one pound should be added for roots and extra food. Nor is the cost of carting and removing the clover-hay at all calculated.

From what has been advanced, it appears pretty clear that, at present prices, draught-horses may be kept in good working order at twenty guineas per annum.

It is seldom necessary to exercise farm-horses. There are few days in the year when nothing can be done with them, especially where a thrashing-machine is used. But one, or even two days of absolute rest, will never do harm. If any circumstance should arise, requiring them to stand a week or more in idleness, a little out-door exercise would be necessary. Turned loose into a straw-yard for a few hours each day would, however, be all that would be found generally necessary.

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CHAPTER XIII.

HORSE BREEDING AND STUD MANAGEMENT.

Breeding horses is carried on with one of three objects—by the farmer and professional dealer for purposes of profit, by noblemen and gentlemen of property to replenish their private stud, and keep up the breed of horses in their respective localities, and by the farmer and private gentleman from the circumstance of their possessing a mare which is a favourite, and whose race they wish to perpetuate; or one for whom there is no employment, and they take the chance of her dropping a valuable foal; or, what is still more usual, she has had an accident, and they wish to make the most of her, without giving much attention to her fitness for the purposes of propagation. We shall endeavour to throw together a few practical instructions for the benefit of each of these classes. The first portion of our remarks will apply to each of these classes of breeders, the latter portion more particularly to the breeders of blood stock and hunters.

There are no specific rules for the breeding of horses which apply to that class of animals alone—at least so far as is generally at present understood. One and the same great principles apply to the horse, the cow, the sheep, and the pig,—only the object in breeding the one is essentially different from that of the other. The sheep and the pig must be bred to feed—the cow to feed or to milk; but the horse must be bred to *go* or *pull*. Hence, while the organs of nutrition and reaction are sought for in the former class of animals, those of respiration and locomotion are most desired in the latter. But valuable as are our race of horses for general purposes, different nations do not seem agreed as to the best mode of obtaining the best. The Arab thinks little of his stallion beyond his prdigree. If his blood is untainted, he thinks of little more; he depends upon his mare for a promising and successful progeny. The Englishman thinks just the reverse. He travels miles aud miles, and attends one show after another to select a proper stallion for, perhaps, the worst mare of his stud; and yet both countries possess a meritorious breed of horses; though, perhaps, there is a vastly greater proportion of *brutes* amongst English than Arabian horses. This, however, may possibly arise from other circumstances than mere attention to breeding.

Without entering into the vexed question of the relative influence of the male and the female animal in horses, or the fanciful theories which have been advanced in connection with it, it may just be named, that some time ago the Highland and Agricultural Society of Scotland opened this very difficult question, and it was propounded in this manner :—whether the breed of live stock be susceptible of the greatest improvement from the qualities conspicuous in the male or female parent? A variety of opinions were elicited, and some from names standing very high, both as the greatest scientific authorities of the day and the best practical breeders. Mr. Boswell, of Balmuto, takes the side that the male is the animal which possesses the greatest transmissive power; and, after an elaborate investigation, concludes that "he is the parent, to which we can alone look, from motives of sense and sound polity, for the improvement of our breed of live stock." Of some males, this is true almost to a proverb. When, for instance, did any one know a foal by the widely-famed President which did not inherit his spirit and action, and even his form? Nay, young President seemed even to inherit his father's graces, as well as his transmissive power. A somewhat more modified view is taken by Mr. Dallas, of Edinburgh, who gives his opinion, that while the male animal is more powerful for imprinting external qualities, the female is the more powerful for those which are internal. Hence he teaches, that the sire ought to be selected for the improvement of the colour, coat, or outward form, and the female for milking, hardiness, temper, and freedom from internal tendency to disease. Mr. Christian, of Mill, takes a middle course, and contends that the offspring partakes of the qualities of that parent which exerts the greatest influence in the formation of the fœtus,—and therefore concludes that it is unsafe to trust to either animal implicitly, but to select for breeding the best on both sides which can possibly be found.

That this is a safe theory, there cannot be the slightest doubt; but the late Rev. H. Berry argued that all improvements of a breed are attributable to high blood, and not to sex at all,—that animals being carefully selected, and kept pure and unalloyed, are those only to be trusted in their transmissive energy,—but, with the modesty so common to all well-informed men, he concludes by admitting, "that with our present scanty stock of information on this difficult question, one only rational course can be adopted by breeders, viz., that of resorting to the best male,—a simple and efficacious mode of improving such stocks as require improvement, and the only proceeding by which stock already good can be preserved in excellence."

Professor Spooner, who writes anonymously, gives a distributive effect to the agency of the parent. Classifying the qualities of all animals as referable to temperament,—the nervous, where intelligence and mental qualities prevail; the thoracic, where the action of the chest and respiratory organs were predominant; and the abdominal, where the feeding propensities prevail,—he seems to intimate that the sire has to do with size, general appearance, and muscular development; while hereditary disease and weakness of constitution are more likely to be communicated to the offspring by the mother than the father. He even goes further, and contends that "when a handsome, well-bred mare is covered by a large, coarse stallion, the defects of the latter are generally considerably softened down. The head is finer; and though the frame of the offspring is larger than the dam, it is handsomer than that of the sire. The result of this cross is generally superior to its converse, where the sire, for instance, is thorough-bred, and the dam a coarse and heavy animal. The progeny, in this case, is often unequal and ill-arranged, possessing, perhaps, the fine legs of the sire and the coarse body of the dam."

In favour of the power of the male as to form, he instances the offspring of the male ass and the female horse, whose size and appearance far more resemble the sire than the dam,—long ears, spare development of muscle, narrow, fat, and sluggish action;—he further urges that the smallest mares will, when served by large horses, produce large progeny. Thus mere ponies will produce stout cobs and galloways, and well-bred mares of fifteen hands, put to a powerful stallion, will give a good size carriage-horse.

In addition to this, as polygamy is the rule in horses, and a mare can hardly be said to produce more than one in a season, while for a few years a stallion will produce fifty; or, giving ten years as the average duration in virility—and in the case of a male horse it is generally much more—the one will have produced ten foals and the other five hundred. Hence, as a *fact*, and connected with our present mode of treating animals, the male has by far the greatest influence on the horses of a country, quite irrespective of his having superior individual effect on the progeny.

The late lamented Lord Spencer—who preferred animal physiology and the study of georgics and bucolics to the rivalry of political debate and the statistics of national exchequers—gave great attention to the points to be arrived at in the selection of male animals. Constitution was by his lordship placed at the head of the list; and hence he recommended a wide chest as a first desideratum, and as being the most strictly indicative of this peculiarity; not only wide in the front, however, but continuing the width behind the forearms, further indicated by fulness behind the elbows. A masculine appearance is also another of his indications of constitutional power. Large muscles are also an indispensable quality in all male animals, whether for food or burden. There are, however, no fixed rules for selection.

Cully attempted a code of rules in 1800, and for half a century we know of no improvement on his description, though breeding and horses have been quite another matter since his day. Like Bacon, Cully saw far before his time, and fore-shadowed the knowledge since proved to be practical by the lapse of fifty years. His rules required smallness of head in the stallion, fine muzzle, expanded nostrils, prominent and cheerful eyes, small, upright, slightly-separated ears, tapering and slightly-curving neck, his shoulders slanting and thin, "going into his neck unperceived"—to use his definite, but somewhat awkward expression. And this is of more importance than can well be imagined. The horse Prince had this peculiarity; and he was one of the showiest and most favourite coaching stallions of his day, generally well made, and a gold bay, upstanding, elegant horse, likely to breed coachers from country mares, and carriage-horses from half-bred mares in grand style. He had thick shoulders; and some of the prettiest progeny resulted from his mares; yet they all had thick shoulders, and a propping, hobbling, stilting action, which battered their fine legs to pieces. They stumbled, and cut, and foundered,—were soon incurably lame, and became prematurely old horses.

To return to the qualifications of a stallion:—He must have muscular fore arms and thighs; circular and wide hoofs; deep and broad chest; round body, and broad loins; long quarters; and tail set on in a line with the back; hind legs and thighs strong and muscular, with clean lathy legs.

In addition to these, the cart or draught horse should have broad hocks, strong flat legs, elbows not too close to the chest, neck rather thick and a little arched, setting on of the head not too acute. For horses used to the collar,—broad straight back, round ribs, and quarters full and muscular.

The mare requires other qualifications. The same remarks apply as to smallness of head, fineness of colour, animation of countenance, brilliancy of eye, and liveliness of appearance. Her jaws must be clean, neck tolerably long, and decidedly strong and muscular at the base, a slight and gentle curve from the withers to the poll, strong and compact knee-joints, clean flat legs, broad based, round foot, withers not too high. She should also, like the stallion, have a deep and broad chest. The shoulders should lie well back; the scapula, or blade-bone, lying obliquely from the shoulder joint. The blade should also be long and wide, and extend nearly to the top of the withers, but attached so closely and so well covered with muscle as not to present any remarkable prominence. The back of the shoulder should be well furnished with muscle; and it should appear, to the mounted rider, of a *wedge-shape*, widening towards his knee. The fore-leg should be perpendicular; the toe and the point of the shoulder being in a right line. The foot should be round, even, and of a dark colour. The heels should be open, but not low. The brisket should be deep and narrow;—this especially applies to a riding-horse, as otherwise a crupper will be necessary to keep the saddle in its proper place. The quarters should be long and oval on the top. In a brood-mare too much breadth cannot be allowed to the hips; but too wide hips in a stallion are an ugly and objectionable point. Attend to the houghs, and see that the shank-bone and sinew, both before and behind, be well developed, and drop straight below the joint. Horses with steep pasterns are seldom comfortable roadsters. Nor need it be said that disease should be carefully guarded against, lest they should become hereditary. Blindness, ringbone, spavin, roaring, broken wind, or contracted feet, &c., should each of them be enough to condemn either horse or mare for breeding. An instance is given by a writer, to prove the force of this truth; a mare with a small bone spavin being bred from in three successive years from different horses. At four years old they were all affected with spavin; and two of the three were utterly unfit for work at five or six years of age.

Take an opposite instance, related by Stephens, the talented editor of the "Edinburgh Journal of Agriculture." He wished to breed a succession of the very best draught-horses. He sought the best young mare he could find, and bought one, such as is seldom shown in a fair, for £42. She was of the Clydesdale breed, and at five years old he put her to a prize Clydesdale stallion—the best of his class. She had four foals in four successive years; the two first—two fillies—were sold at his sale for £108, for brood-mares. Two four-year-old colts brought £38 and £44.

From this it is clear how much may be done by careful selection, good constitution, and *youth*. If mares are reserved till they are old before they are bred from, their vital energies are impaired. The black cart-horse, of which we have given an engraving in our chapter on draught-horses, was from a mare five years old, and was her first foal; nor did his birth interfere more than a month with the mare's constant work on a light turnip-soil farm.

It may be imagined that the breeding of horses is a source of great profit. A hunter is often sold, at five or six years old, for a hundred guineas; in the mean time doing a certain amount of light work for his master. Occasionally as much as one hundred and fifty guineas are given. Indeed it is nothing uncommon for noblemen to give a larger sum. The late Lord Alvanley was always ready to give two hundred guineas for a hunter that would carry him at full speed for twenty-five minutes. This seems to offer a very great encouragement to breed horses, especially of the better class. But it is a problem referable only to the laws of *chance*. There are risks, and chances, and expenses without end; and though judgment, and the selection of a good stock from which to breed, have much to do with success,—yet, like a toss of the dice, "luck's all." The breeder of valuable horses has the risk of keeping brood mares which do not breed, or which are abortive in their produce; or the foal comes a filly—or it goes on prosperous, and an accident happens—which turns out a blemish; and so years of keep are thrown away. These chances are so many, and so great, that it requires insurance tables, formed on past data, whereby to calculate the chances of success.

But a young draught-horse sells for his £30 or £35. His mother does her work, and earns her food. Whether colt or filly, the produce is valuable. A slight blemish will not be so utterly destructive. It may reduce his class, and consequently his price; but it will not ruin him. He may even be kept for work. Having less blood, he is less liable to accidents; and he begins to earn his keep; if not at two years, at least he does it at three years old; and therefore this must be taken into account. No fear need be entertained, with an increasing population, that the market for this class of horse will ever be much overstocked.

The following may be taken as the mean cost of breeding a cart-horse up to three years old:—

	£	s.	d.
First Year.			
Cost of stallion	2	2	0
Groom's fee	0	2	6
Mare's keep when off work, say 6 week's at 3s. 6d.	1	1	0
Foal's grass up to Michaelmas	1	0	0
Colt in straw-yard, with allowance of 1 bushel of oats per week for 20 weeks, at 2s.	2	0	0
Additional allowance of clover in spring	0	5	0
Second Year.			
Grass, 25 weeks, at 2s. 6d.	3	3	0
Colt in straw-yard (as above)	2	0	0
Additional clover	0	5	0
Third Year.			
Grass, 25 meals, at 2s. 9d.	3	9	6
Colt in loose box, 20 weeks	2	0	0
Additional clover	0	7	6
Additional corn	0	16	0
Breaker's time	0	14	0
	£19	5	6

Now this is perhaps taking the cost at the lowest possible amount; but if a colt so treated is worked the next season, he will amply pay for his feed, and hence it is improper to reckon anything more. And as he would be worth say from £30 to £35, it is quite clear that the owner would make £10 for his trouble and risk. But let it be ever borne in mind, that horse-breeding impoverishes the land. Horses at all times are a heavy and impoverishing stock; but young or growing horses are by far the worst. Something more than a mere return for the labour and outlay should therefore be calculated on. There ought to be *profit*, to pay for the risk and deterioration of the soil.

If with this we contrast the breeding of cattle of a useful and valuable kind, say a short-horn, we shall see the relative position of the two breeders. The only difference is, that the breeder of short-horns will sell his produce at two years old, or feed them at two and a half. As it is a question of breeding, however, and not of fattening, we will suppose he sells off his two-year-old stirk, which costs him, for—

	£	s.	d.
Cost of bulling	0	5	0
Cow, seven weeks' feed, whilst dry . . .	1	1	0
Fourteen days' new milk, 4 qrts. per day, 1½d. . .	0	7	0
Twenty weeks' skim milk, 4 qrts. per day, at ½d. .	1	3	4
Hay, cake, and turnip for the same period, at 1d. per day	0	11	8
Grass, first summer	1	1	0
Winter feed on turnips, 20 weeks, at 1s. . .	1	0	0
Cake or artificial food, do. do. say 2lbs. per day, at ¾d.	0	17	6
Grass, second summer	1	10	0
	£7	16	6

Now, though the price of cows will vary, and especially of a young stirk, still the two-year-old should be worth ten guineas; leaving a profit of £2 13s. 6d.; the manure, in both cases, being supposed to compensate for the attendance.

At first sight, this appears to leave a smaller profit than the breeding of horses. It is a profit of nearly £3 for two years' keep and risk, against a profit of £10 for three years' keep of the horse;—but with this difference: there is no danger of blemish in the ox—no fear of bad action, or spavin, or ringbone. It will also be observed, that credit is given for the keep of the cow during the period she is dry. It is questionable, however, if this be admissible. She is dry for other purposes than breeding—stoppage of milk, to restore her secretive powers, being required; and if this guinea be added to the profit, it will leave a sum of £3 14s. 6d. for the keeping of a calf for two years, against risk of loss, interest of capital, medicine, and deterioration of soil by *breeding*, instead of *feeding* animals,—a deterioration which must be made up either by the purchase of extraneous manure, or by some other system of remunerative cropping.

Foals produced from a well-selected mare, by a suitable stallion, may be used for light work from their third to their sixth year, when they may be sold, so as amply to repay the breeder. It is usual, sometimes, to purchase young colts of good quality at two years old, to rear for sale, in preference to breeding. The advantage of this system is questionable; especially if the cause of its adoption be *deficiency of pasture*. The plan usually adopted by the principal English dealers for making up young horses for sale is to turn them into good grass, taking them up a week or two before they are to be sold, for the purpose of giving them a coat, reducing their carcasses, and teaching them to lead; and it is certain, that to deal in this manner successfully, requires no small amount of knowledge of the animal, and of the tricks to which jockeys are in the habit of resorting.

The age at which a mare should be put to the horse is from three years upwards. Some have injudiciously bred at an earlier age, and disappointment has been the result. Mr. Youatt says, that if the mare has been lightly worked, she may be used for breeding until she is twenty. It is questionable whether breeding from any mare over twelve years, at the very utmost, will prove satisfactory. The horse is at his best for breeding at the age of from six to ten. The most favourable time of putting the mare to the horse is from March to the beginning of May. The reason of this is, that the time of foaling will be thus regulated; and the earlier, after the beginning of March, that a mare foals, the more profitable. Colts foaled in March are generally found to turn out hardier, and to stand work better, than those foaled later. A mare may with advantage rest for ten days after having had the stallion. She may then be worked as usual; reducing the work, however, as pregnancy advances. If she is put to the plough she must have the swingle-tree lengthened one-third, to keep the traces from her sides. When the period of foaling approaches, the mare should cease working altogether, and should be turned into the best pasture of the farm. A few weeks' high feeding at this period will not only nourish the foal which she is carrying, but will furnish her with a supply of nutriment for it against its birth. The pasture into which the mare is turned should be provided with sweet water and with shelter. The foal will be the better for running the entire year at the side of its dam.

Mares usually foal so readily that it is superstitiously said to be unlucky to see them foal. Occasionally, however, it is otherwise. Should the mare experience any difficulty in delivery, it is advisable in every case to call in a regularly educated veterinary surgeon; and on no account to permit the quackery of itinerant cow or horse-doctors, as they style themselves. Many a valuable mare, and many a foal that would have turned out a credit to its breeder, has been thus lost.

After foaling, the mare should be turned into a good pasture, well supplied with water and shelter; and if she have foaled early, say in April, and the grass is scanty, let her have a feed or two of oats or of linseed and bean meal daily. If the corn be given in a trough near to the ground, the foal will partake of it along with its dam. As the grass becomes plentiful the corn may be diminished, or even discontinued. When a mare is kept expressly for breeding, she will be again at heat, and should be put to the horse about six weeks from foaling. She may then also resume light work. At first the foal should be shut up in the stable during working hours; but as it acquires sufficient strength, it may be allowed to follow its dam. The work on which she is employed will contribute to the health of the mother, and increase her flow of milk, and, by accompanying her, the foal will suck more frequently, thrive better, become more *tame*, and will gradually become familiarized with the objects among which it is afterwards to live. Under these circumstances the foal may be weaned at the age of six months. For this purpose it should be either housed, or turned into some pasture or rick-yard at a distance from the dam, and should be liberally fed every morning and evening. Bruised oats and bran are the best description of feeding that could be adopted; towards the end of summer the foal may be turned out to general pasture without fear of again seeking its dam. Too much pampering will prove as prejudicial as neglect.

Should the foal be a male, and emasculation be determined upon, the period of weaning is a good time to perform the operation. This, however, must not be done if weaning takes place in the months of June or July; the *fly* then abounds,—by its attacks, restlessness, and consequent inflammation, will be promoted, and convalescence retarded. Early spring, or an advanced period of the autumn, are the best periods for this operation. Let no itinerant doctor or village quack be the operator, unless you really desire to lose your colt. Call in a regular veterinary surgeon of reputation; leave the operation in his hands, and attend implicitly to his directions as to after-treatment. Indeed, for the sucking foal, scarcely any further after-treatment than simple quiet is necessary; but bleeding and the exhibition of aperients are advisable for a colt of more advanced age. There is now no pecuniary risk attendant upon the emasculation of a horse of any age, as an *insurance* can be effected at a trifling per centage, and most regular veterinary surgeons will themselves be found willing to entertain the proposal. The French veterinarians have paid great attention to this subject; and M. Goux, of Agar, lays down principles, the result of great experience, of which we give a short analysis. Not that it is to be supposed that any ordinary breeder will be able to undertake the castration of the foal from instructions derived from any written treatise. It is a nice and delicate operation, fit only for the hands of the practised and scientific man who has made the anatomy of the horse his peculiar study, and is not to be performed by unskilled hands; many a horse has been ruined by the ruptures, the inflammations, and the diseases brought on by unskilful castration. Tetanus and sloughing are sometimes the harbingers of death, brought on by unscientific practice. These are the results of the experience of M. Goux.

"As a principle," he says, "colts ought to be cut while at their dam's side. This constitutes the rule. The presence of hernia, or the absence of testicles, should cause the postponement of the operation. This constitutes the exception.

"The adoption of castration, at the earliest practicable period after birth, is favourable in all points of view. Deprivation of the testicles is the object, and this abstracts nothing from the development of the animal. Indeed the conformation becomes improved by it, especially in such horses as are to serve the double purpose of the saddle and draught, or that are intended for the army. Their fore-quarters are rendered lighter by it, their muscular energy in no manner diminished, and their character made milder. Their rearing, their breaking, their training, are rendered easier; neither exists there any apprehension of premature fecundation, bastardizing produce, and deteriorating breed; nor fear of accidents such as happen with entire colts.

"The preferable method of procedure, at the age at which we recommend castration, is by ligature. The youthhood of the animal, the little development of the cords, the rudimentary condition of the organs themselves, the simplicity of the means, all conduce to recommend its adoption.

"In the employment of the ligature, prudence dictates procedure by the covered operation (*à testicles couverts*), and the precaution of passing the ligature through the end. By this twofold precaution hernia is avoided, and hemorrhage prevented. The accidents by which it is possible for such an operation to be followed are rare, in consequence, we repeat, of the youth of the subject, and of the simplicity of the proceeding adopted. For the most part, such accidents are easily remediable when they do occur. Considering their paucity and their trivial nature there is no comparison between the method we propose, and the method practised by castrators in general."

The above translation is given in the hope that experiment and investigation may follow. The risk of castration is much less in extreme youth; but it has also its disadvantages.

One thing, however, deserves mention; when a horse is suffered to attain two-thirds of his growth, prior to emasculation, you obtain an animal of far superior form, power, and value, to that which has been operated upon when a foal. It is as well to bear this in mind, as the insurance principle, which has already been alluded to, obviates all risk on the part of the proprietor. But the risk is much greater; and the French principle is by far the safest, and least painful.

Stud Management.—The best hunters, perhaps, in the kingdom, come out of Yorkshire, especially the East Riding. A few remarks on their management, therefore, may be interesting and useful.

The first essential for breeding sound "blood" horses is to have a regularly kept stud of brood mares, whose duties shall be simply confined to the *breeding*. These should be carefully selected both for form and blood; and, as they have no other duty to perform, they should be chosen and retained with a view to that alone. The second essential required is a dry and bracing but not bleak atmosphere, with the paddocks thoroughly under-drained. The third essential is, that the stables and boxes are well arranged, both as to aspect and ventilation. Counties where the atmosphere is moist, and where fogs prevail, are altogether unfit for a breeding stud.

As a general rule, any gentleman commencing a breeding establishment, will avail himself of such accommodation as he possesses; but it will generally happen that a trifling alteration, made with judgment, will improve the existing arrangements. The buildings of a breeding-farm should be surrounded with small paddocks, lying, if possible, to the south of the stables, so as to secure a southern exposure. The paddocks, being chiefly required for exercise, need not be large; but they should be free from holes, and the fences should be of such a description as to render accidents impossible. The buildings, whether boxes or hovels, should be perfectly dry and well ventilated. The doors should be four feet wide, and so formed as to prevent mares in foal from injuring themselves. Collars on each door-cheek, covered with canvas, is a useful precaution here. Attached to the buildings, and in the quietest part, one or more boxes, according to the extent of the establishment, should be set apart for mares to foal in, which should not be less than sixteen feet square; and these foaling-boxes should be placed near the inhabited parts of the stable. When this is attended to, and brood mares carefully selected, both for form and blood, the primary considerations are fulfilled. The mare has seldom any other duty to perform in a well-ordered breeding establishment; she ought to have none. It is true a brood mare is often used as a hunter for a couple of years; but as her work as a breeder requires very different treatment, and withal much less costly keep, she is seldom kept up or fed on hard food. During the period of gestation, she is usually absolved from every kind of work; and some breeders go so far as to use unbroken fillies for the purpose of brood mares. This is, however, rarely the case. Too often some blemish or accident leads to her being put to the horse. When mares are purchased for breeding purposes, the usual age to commence breeding is five years old, and some mares will continue to breed till they are sixteen or even twenty years old. If they fail to produce in two successive years they are usually considered useless and barren.

The choice of a stallion is by no means either a matter of chance or caprice with the Yorkshire breeder. He is nice in his discrimination, and, as thorough-bred entire horses are not always travelled, he often sends a mare to the stables of the stallion-keeper, for six or nine weeks in the season, at board wages, until the impregnation has been successful. Five or ten guineas are often given for a cover, as well as a handsome fee to the groom, and a good price also for her keep in the stable. The stallion is, like the mare, selected not only for form and action and pedigree, but also for the *character of his stock*. Some horses are the sires of a long list of absolute winners. There were more and better horses produced from Old President, perhaps, than from any horse of his day. By all sorts of names they seemed to be more or less excellent. He was a patriarch in horse-producing; and to have it said that a horse was out of a "President's mare" was at once a guarantee of action, of bottom, and of quality.

The covering usually takes place in April or May; and, as the mare goes eleven months with young, she may be reckoned a month backwards to ascertain her period of foaling. With blood horses the period of birth is of consequence, as they are reckoned by years, at whatever period they are foaled,—thus, on the first of January, 1852, the foal dropped in May or June, 1851, is a year old; and hence February or March are months when the season of the mare is frequently anticipated by artificial feeding. For this purpose a quart of hemp-seed is sometimes said to be given, night and morning, for a week or ten days. In some instances the mere trial by the horse is a provocation of desire.

During the period of gestation the mare is always turned out, and usually at first runs in an ordinary seed-field or pasture. At Michaelmas she will require either housing or sheltering; and artificial food of some kind is invariably given. On most farms the shelter of a horse-box, or cow-house without stalls, is used, with a feed of corn each night and morning, and a little hay out of doors when the snow is on the ground, or when the weather is unusually cold; but the best breeders have their fields divided into paddocks, of two to three acres each, with boxes or houses attached. A well-drained field, on a southern acclivity, with a warm hedge-wall, or, what is better, a fence to the north and east, made of gorse faggots, and divided by paling or hoarding, or even by the same sort of fence, and furnished with a brick or gorse-built square loose box for shelter, will make an excellent breeding paddock.

These paddocks are all mown very early in July, and the fog or after-grass is unbroken. Into this the mare is turned, or a pair of mares together, when the pastures fail, in October or November. To this long grass a very small feed of corn per day is added, and when one or other is expected to foal, they are separated into adjoining paddocks, where they can hear and even see each other. This is the period when there is danger of abortion occurring. The eye of the owner should therefore be constantly on the mare, after her fifth month of gestation. Moderate exercise and good feeding are about the best preventives.

Mr. Youatt observes that the *imagination* exercises a powerful influence on mares; and he therefore directs that when liable to abortion they should be kept with others that have gone to the fifth or sixth month, lest her example should infect them with the disease. We have also reason to believe that abortion in mares is sometimes epizootic.

As the period of parturition approaches, a keen eye should be kept on the mare. It is generally indicated by waxy matter on the teats, and a loosening of the vagina. Uneasiness and restlessness are still more unequivocal symptoms; and when these appear she requires to be sat up with all night, by a trusty, practised, and intelligent groom. It has been said that no one ever saw a mare in the act of foaling, and some are so superstitious as to close the door lest they should witness the act. The last act, if all be right, is certainly rapid, and help is seldom needed. But if assistance be necessary it should be rendered quietly and promptly, and the foal pulled, not by the legs, but as much as possible by the head. Violence of all kinds should be studiously avoided; for of all animals the mare which has had regular exercise is the least likely to suffer from parturition, and the most likely to suffer from violence.

For the first few weeks after foaling, shelter, bran mashes, and warm food are assiduously given. The foal should be watched with great attention, and if he does not, soon after being dropped, attempt to raise himself up, a little milk is drawn, and administered by the spoon. In young mares, this must be done with the greatest care and caution; and some will require the exercise of much coaxing and patience before they will allow the foal to suck; while, at the same time, the foal is probably too weak to make any vigorous efforts.

The foal will soon begin to eat. The young grass of spring, and an idle mother's milk, which the Yorkshire breeder of hunters always affords to the foal, pushes it vigorously on; and when very valuable horses are bred, the separate or paddock system is still adopted. If the foal is a colt, no pains, expense, nor trouble, is grudged,—if a filly, it is allowed to herd with the other filly foals in the worst pasture, and thus it takes its chance.

The weaning is a critical time. The foal should be confined in a loose box, and the mother taken away to a poor pasture, to facilitate the dispersion of the milk, and to keep the mother and foal from the reach of each other's voices. The foal should be liberally fed with hay and oats, and kept comparatively still and dark; and, by kindness and attention, it soon forgets its parent. It now joins its fellows in a field or paddock; but for the first winter it is usually fastened up in a house by itself at night; or a pair are put together for company, which are let out during day time; a plentiful allowance of hay, cut clover, oats, and carrots being given, but no attempt made at increasing its growth. A little linseed is often added with great advantage.

In the first summer they leave the paddocks, and graze in a seed pasture, or on old sward; and if ever it becomes hard or deficient, a moderate allowance of oats is invariably given. In the second winter, shelter, out-door feeding during the day, and a liberal supply of clover, hay, or corn are given.

To recapitulate:—Amongst the great secrets of the Yorkshire stud management, and the causes of their success in breeding horses, the following particulars may be named:—

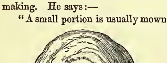
The greatest care is taken to have brood mares specially selected, and kept for that purpose, and having these conformations, blood, and qualities, calculated to produce the best stock. Above all, youthful vigour is required, if good stock is looked for.

The most critical and minute attention is paid to the selection of a stallion most suitable to the mares, and one which has obtained a character for being the *sire* of good hunters, and having the power to transmit his qualities, and having, moreover, those *points* in perfection in which the mare is deficient.

The great care, food, and shelter afforded to the mare during the period of gestation (with the abundant supply of succulent food in all stages of her connection with the foal, especially when sucking), are the chief sources of excellence in the produce. The careful manner in which the hay is made in Yorkshire has also a very material influence on its nourishing qualities, and therefore its fitness for food.

Mr. Milburn, in his Prize Essay, addressed to the Royal Agricultural Society of England, thus sums up the Yorkshire modes of haymaking. He says:—

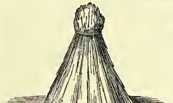
"A small portion is usually mown, turned assiduously, and always placed in lap-cocks, *i. e.* raked into small heaps of the dimensions just capable of being taken up in the arms, and then shaken so as to present an even surface. It is folded round by the arm, and so doubled, and set down firmly on the ground, where it remains until another favourable day, when they are again thrown out and exposed to the sun. This is repeated until the whole is fit for 'pike,' or conical heaps, containing from half a ton to a ton. These, after undergoing an incipient sweating or fermentation, are combined in a stack, where they again undergo fermentation, which imparts a grateful and peculiarly rich aroma, besides giving to the hay its nutritive character, which enables cattle to get fat upon it alone, without any other food."


HAY "LAP-COCK."

The influence of lime on some of the soils, as regards productive qualities, Mr. Milburn says, is quite extraordinary:—

"The lime is of the purest possible character, and the effects produced by its application, even upon those grass-lands lying immediately upon the limestone, cause coarse benty grasses to disappear before it, and give place to the rich and thick-set white clover,—even where no seed has been sown. These effects are not easily accounted for, except on the hypothesis that the seeds exist in the soil in a condition unfavourable to germination, and that they are stimulated by the external application of the lime. Whatever may be the cause, there is no doubt whatever of the fact."

In the East Riding there is less grass land, and the clovers and artificial grasses are more generally made into hay.



CLOVER "RUCKLE."

"We are not aware," says Mr. Milburn in the same Essay, "that this mode is carried on in any other part of the kingdom as it is in the North Riding of Yorkshire. So soon as the surface is dry, a portion, about a yard in length, of the swath is taken, and the surface folded inwards, and the whole rolled into a kind of cone. A piece of rye-grass is pulled out of the top and tied round the head of the 'ruckles,' as they are called, which are then set in rows to admit of their being easily carted. Thus, while the sun and air thoroughly dry the whole mass, the rain, should it come, descends over the inclined surface of the cone; and as the large mass of leaves the clover possesses renders it peculiarly liable to injury from the wet, this process is most valuable, and in few places is it secured in better condition. In a dry hay-time it is carted directly from the 'ruckles' to the stack. In a wet season, they are sometimes pulled down before they are carted off, and made into 'pikes,' or small heaps, of from two to three cart-loads each. Here the clover is allowed to ferment, and in a week or two it is put into the stack."

Besides the abundant shelter and nourishing food afforded to young horses in every period of their growth, their out-door life combines to assist the full development of the Yorkshire hunter, and forms an important feature in the Yorkshire stud management.

Nature has adapted the eastern and western moorlands of Yorkshire in a remarkable manner for the training of race horses. The training ground of Hambleton on the former, and Middleham and Richmond on the latter, are such as can seldom be found elsewhere. Cool in the hottest summer, level as a bowling-green, covered with soft, fine, short, mossy grass, a cover of soil so thick as not to give way under the horses' feet, yet sufficiently soft and pliable to prevent injury, they present advantages perhaps unequalled in any other part of the country.

The fairs of Howden, of Beverley, and of North Allerton, are as celebrated for sound, excellent, and valuable horses as those of Yarrow and Thirsk are for those other productions of the county—the Yorkshire short-horns.

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CHAPTER XIV.

HORSE TAMING AND ITS SECRETS.

The principal danger and inconvenience attendant upon vice in a horse, consists in the difficulty of approaching, securing, handling, or dressing him. The situations in which the vicious animal is found require to be considered separately—viz., in the stable, fastened to the manger, saddled, harnessed, or naked, and at liberty. Before approaching any horse, it is necessary to form some sort of judgment of his moral character; and this will be gathered from his physiognomy and gesture, with far more certainty than from the reports of those about him. If the eyes be wild and threatening; if rapid glances be thrown around; if the ears be thrown backward and the tail slightly moved,—be cautious not only how you approach, but how you quit him. If you approach a horse in the stable, never do so abruptly; but first speak to him firmly but gently, and order him to "*bout*," or "*come over*." If he obey, and move to one side, you may approach up close to his shoulder, taking the halter in your hand the moment you arrive there. If his head be then kept down he can do no mischief, especially if the right hand be laid on the horse's shoulder, and the body extended so as to keep at a sufficient distance from the forelegs. While thus held, the horse may be barnacled, blinded, muzzled, hobbled, or, in short, done anything with you please. If a vicious horse have his eyes bandaged, and be rapidly turned round a few times, he will become passive, and this plan has succeeded where all other means have failed. Never approach a horse on the *right* side; it is from this side he *kicks*.

The power which human beings possess over all the lower creation, appears in all their movements. The human *eye* seems to possess a talismanic influence, like that said to be exercised by a serpent on some kinds of birds. It strikes terror, and awes into subjection. The *voice* will scare away the boldest and most savage denizens of the forest, while a firm and determined bearing will often arrest the most viciously inclined, or subdue the most obstinate. The horse, especially, is an excellent judge of men's dispositions and tempers. He hates and fears, and often inflicts summary vengeance on the ill-tempered, the passionate, and the revengeful. He also has his affections; and the docility, the patience, and the friendship he often exhibits, are models worthy of the imitation of many who consider themselves civilized men.

Instances of persons possessing unusual power over horses are on record. One is related of a trainer who was in the habit of purchasing all the supposed irreclaimably vicious horses he could hear of, if otherwise promising; and these, in an incredibly short space of time, he would produce thoroughly tamed, and as quiet as so many lambs. The secret was a simple one. The trainer had a *leaden knob* at the end of his whip, and with this he struck the animal on the nape of the neck every time it kicked, plunged, or showed any sign of vice. This came on the creature like an electric shock; and being struck on a part so sensitive, it soon ceased to resist, and stood for a moment as if stunned. The trainer then caressed it, spoke to it coaxingly, and gradually succeeded in bringing it to do all that he required. By thus alternately using severity and kindness, he succeeded, not only in rendering two stallions docile, but also in subduing a number of other fiery, untameable animals, which he purchased almost for nothing.

Many a vicious horse has been tamed by being ridden furiously over heavy ploughed land, until his strength was perfectly exhausted. In Germany, it is a common practice to suspend furious horses in a frame until their strength is exhausted. Starvation, bleeding, narcotics, have severally been tried with a view to taming a vicious horse. These remedies will, however, generally be found to have only a temporary effect; and they are more or less calculated to prove prejudicial to the animal's health. Moreover, they are savage and brutal modes, and are destitute of intelligence and skill.

Extraordinary powers of horse-taming are possessed by some individuals. The following is from the pen of Mr. Castley:—

"When a young man, I remember purchasing a horse at a fair in the north of England, that was offered very cheap, on account of his being unmanageable. It was said that nobody could ride him. We found that the animal objected to have anything placed on his back, and that when made to move forward with nothing more than a saddle on, he instantly threw himself down on his side with great violence, and would then endeavour to roll upon his back. There was at that time in Yorkshire a famous colt-breaker, known by the name of JUMPER, who was almost as celebrated in that country for taming vicious horses into submission, as the famed WHISPERER was in Ireland. We put this animal into Jumper's hands, who took him away, and in about ten days brought him home again, certainly not looking worse in condition, but perfectly subdued, and almost as obedient as a dog; for he would lie down at this man's bidding, and only rise again at his command, and carry double or anything. I took to riding him myself, and may say that I was never better carried for six or eight months, during which time he did not show the least vice whatever. I then sold him to a Lincolnshire farmer, who said that he would give him a summer's run at grass, and show him as a very fine horse at the great Horncastle fair. Happening to meet this gentleman in the following year, I naturally enough inquired after my old friend. 'Oh,' said he, 'that was a bad business: the horse turned out a sad rebel. The first time we attempted to mount him, after getting him up from grass, he threw the man down with the greatest violence, pitching him several yards over his head; and after that he threw every one that attempted to get on his back. If he could not throw his rider, *he would throw himself down.* We could do nothing with him, and I was obliged at last to sell him to go in a stage-coach.'"

Another case is that of SULLIVAN, the celebrated Irish horse-tamer, whose peculiar method of effecting the desired end procured for him the title of the "WHISPERER." The following notice of this remarkable person appears in Townsend's "Survey of the County of Cork:"—

"James Sullivan was a native of Cork, and an awkward, ignorant rustic of the lowest class, generally known by the appellation of the Whisperer, and his profession was horse-breaking. The credulity of the vulgar bestowed that epithet upon him, from an opinion that he communicated his wishes to the animal by means of a whisper, and the singularity of his method gave some colour to the superstitious belief. As far as the sphere of his control extended, the boast of *veni, vidi, vici,* was more justly claimed by James Sullivan than by Cæsar, or even Bonaparte himself. How his art was acquired, or in what it consisted, is likely to remain for ever unknown, as he has left the world without divulging it. His son, who follows the same occupation, possesses but a small portion of the art, having either never learned the whole secret, or being incapable of putting it in practice. The wonder of his skill consisted in the short time requisite to accomplish his design, which was performed in private, and without any apparent means of coercion. Every description of horse, or even mule, whether previously broke or unhandled, whatever their peculiar vices or ill habits might have been, submitted, without show of resistance, to the magical influence of his art, and, in the short space of half-an-hour, became gentle and tractable. The effect, though instantaneously produced, was generally durable; though more submissive to him than to others, yet they seemed to have acquired a docility unknown before. When sent for to tame a vicious horse, he directed the stable in which he and the subject of his experiment were placed to be shut, with orders not to open the door until a signal was given. After a *tête-à-tête* between him and the horse for about half-an-hour, during which little or no bustle was heard, the signal was made, and on opening the door the horse was seen lying down, and the man by his side, playing familiarly with him, like a child with a puppy dog. From that time he was found perfectly willing to submit to discipline, however repugnant to his nature before. Some saw his skill tried on a horse which could never be brought to stand for a smith to shoe him. The day after Sullivan's half-hour lecture, I went, not without some incredulity, to the smith's shop, with many other curious spectators, where we were eye-witnesses of the complete success of his art. This, too, had been a troop-horse; and it was supposed, not without reason, that after regimental discipline had failed, no other would be found availing. I observed that the animal seemed afraid whenever Sullivan either spoke or looked at him. How that extraordinary ascendancy could have been obtained, it is difficult to conjecture. In common cases this mysterious preparation was unnecessary. He seemed to possess an instinctive power of inspiring awe, the result, perhaps, of natural intrepidity,—in which, I believe, a great part of his art consisted; though the circumstance of the *tête-à-tête* shows, that upon particular occasions something more must have been added to it. A faculty like this would, in other hands, have made a fortune; and great offers had been made to him for the exercise of his art abroad; but hunting and attachment to his native soil were his ruling passions. He lived at home in the style most agreeable to his disposition, and nothing could induce him to quit Duhallow and the foxhounds."

To resume. Some years since I met with a person named O'Hara, whose performances I can affirm to have been truly wonderful, and very similar to those described as having been performed by Sullivan. Whether O'Hara was acquainted with Sullivan's secret or not, I cannot say; but he seemed, at all events, able to produce equally surprising effects. On one occasion, when under the influence of liquor, O'Hara was heard to declare that *his* secret lay in *rocking* the horse; but on another occasion, when equally tipsy, he spoke of *biting* the animal's ear or lip—I forget which; but I think it was the former.

The following anecdote is related of Sullivan by Mr. Castley:—

"At the spring-meeting of 1804, Mr. Whaley's King Pippin was brought on the Curragh of Kildare to run. He was a horse of the most extraordinary savage and vicious disposition. His particular propensity was that of *flying at* and *worrying* any person who came within his reach; and, if he had an opportunity, he would get his head round, seize his rider in the leg with his teeth, and drag him down from his back. For this reason, he was always ridden with what is called a *sword*, which is a strong flat stick, having one end attached to the cheek of the bridle, and the other to the girth of the saddle—a contrivance to prevent a horse of this kind from getting at his rider. King Pippin had long been difficult to manage, and dangerous to go near, but on the occasion in question he could not be got out to run at all. *Nobody could put the bridle on his head.* It being Easter Monday, and consequently a great holiday, there was a large concourse of people assembled on the Curragh, consisting principally of the neighbouring peasantry; and one countryman, more fearless than the rest of the lookers on, forgetting, or perhaps never dreaming that the better part of courage is discretion, volunteered his services to bridle the horse. No sooner had he committed himself to this operation, than King Pippin seized him somewhere about the shoulders or chest—'And,' says Mr. Watts (Mr. Castley's informant), 'I know of nothing I can compare it to so much as a dog shaking a rat.' Fortunately for the poor fellow, his body was very thickly covered with clothes,—for on such occasions an Irishman of this class is fond of displaying his wardrobe; and if he has three coats at all in the world, he is sure to put them all on. This circumstance, in all probability, saved the individual who had so gallantly volunteered the forlorn hope. His person was so deeply enveloped in extra integuments, that the horse never got fairly hold of his skin, and I understand that he escaped with but little injury, beyond the sadly rent and totally ruined state of his holiday toggery. The Whisperer was sent for, who, having arrived, was shut up with the horse all night, and in the morning he exhibited this hitherto ferocious animal following him about the course like a dog—lying down at his command, suffering his mouth to be opened, and any person's hand to be introduced into it; in short, as quiet almost as a sheep. He came out the same meeting, and won his race, and his docility continued satisfactory for a considerable time; but, at the end of about three years, his vice returned, and then he is said to have killed a man, for which he was destroyed."

Some time ago, an article in connection with the subject of horse-taming appeared in the *Times* newspaper, in which allusion was made to Mr. King, proprietor of the Learned Horse, then exhibiting in London, and it was stated that Mr. King professed that his art depended on the *compression of a certain nerve* in the horse's mouth, called "the nerve of susceptibility."

The secret of Sullivan's summary mode of taming the horse is likely for ever to remain a mystery; but it is certain that a power little removed from his is attainable by a very simple process. That Sullivan's son, however, either had not inherited the secret from his father, or was unable to put it in practice, is evident from the many failures which attended his attempts. Amongst others, the following is from Mr. Castley's account:—

"We had in the regiment a remarkably nice horse called Lancer, that had always been very difficult to shoe; but seven or eight years ago, when we first got him, he was downright vicious in that respect. When the regiment was stationed in Cork, the farrier-major sought out the present Sullivan, the son of the celebrated Whisperer, and brought him up to the barracks, in order to try his hand upon Lancer, and make him more peaceable to shoe; but I must say this person did not appear to possess any particular controlling power over the animal more than other men. Lancer seemed to pay no attention whatever to his charm, and at last fairly *beat him out of the forge*."

An account published some years ago by Mr. Catlin, whose experience among the American Indians has obtained for him so much celebrity, bids fair partially to solve the mystery, or at least to suggest some important inferences. He thus describes the mode in which the Indian tames the wild horse:—

"He coils the *lasso* on his arm, and gallops fearlessly into the herd of wild horses. He soon gets it over the neck of one of the number, when he instantly dismounts, leaving his own horse, and runs as fast as he can, letting the lasso pass out gradually and carefully through his hands, until the horse falls for want of breath, and lies helpless on the ground. The Indian advances slowly towards the horse's head, keeping the lasso tight upon its neck, until he fastens a pair of hobbles on the animal's two fore feet,—when he loosens the lasso, giving the horse a chance to breathe, and passing a noose round the under jaw, by which he gets great power over the affrighted animal, that is rearing and plunging when it gets breath, and by which, as he advances hand over hand towards the horse's nose, he is able to hold it down, and prevent it from throwing itself over on its back. By this means he gradually advances, until he is able to place his hand on the animal's nose, and over his eyes, and at length to *breathe into his nostrils*, when it soon becomes docile and conquered; so that he has little else to do than to remove the hobbles from its feet, and lead or ride it to the camp. The animal is so completely conquered, that it submits quietly ever after, and is led or ridden with very little difficulty."

Mr. Youatt, in his excellent volume on the horse, gives the following interesting note:—

"Mr. Ellis, B.A., of Trinity College, Cambridge, happened to read this (Mr. Catlin's) account, and he felt a natural desire to ascertain how far this mode of horse-taming might be employed among British horses. He soon had the opportunity of putting the veracity of the story to the test. His brother-in-law had a filly, not yet a year old, that had been removed from her dam three months before, and since that time had not been taken out of the stable. A great amateur in everything relating to horses was present, and at his request it was determined that the experiment of the efficacy of breathing into the nostrils should be immediately put to the test. The filly was brought from the stable, the amateur leading her by the halter. She was quite wild, and bolted, and carried the amateur a considerable distance. He had been using a short halter; he changed it for a longer one, and was then able to lead the little scared thing to the front of the house.

"The experiment was tried under manifest disadvantage,—for the filly was in the open air; several strangers were about her, and both the owner and the amateur were rather seeking amusement from the failure, than knowledge from the success of their experiment.

"The filly was restive and frightened, and with great difficulty the amateur managed to cover her eyes. At length he succeeded, and *blew* into the nostrils. No particular effect seemed to follow. He then *breathed* into her nostrils, and the moment he did so, the filly, who had very much resisted having her eyes blindfolded, and had been very restive, stood perfectly still, and trembled. From that time she became very tractable. Another gentleman also breathed into her nostrils, and she evidently enjoyed it, and kept putting up her nose to receive the breathing.

"On the following morning she was led out again. She was perfectly tractable, and it seemed to be almost impossible to frighten her. A circumstance which, in a great measure, corroborated the possibility of easily taming the most ferocious horses, occurred on the next day. A man at a neighbouring farm was attempting to break in a very restive colt, which foiled him in every possible way. After several manœuvres, the amateur succeeded in breathing into one of the nostrils, and from that moment all became easy. The horse was completely subdued. He suffered himself to be led quietly away with a loose halter, and was perfectly at command. He was led through a field in which were four horses that had been his companions. They all surrounded him. He took no notice of them, but quietly followed his new master. A surcingle was buckled on him, and then a saddle, and he was finally fitted with a bridle. The whole experiment occupied about an hour, and not in a single instance did he rebel.

"On the next day, however, the breaker, a severe and obstinate fellow, took him in hand, and, according to his usual custom, began to beat him most cruelly. The horse broke from him, and became as unmanageable as ever. The spirit of the animal had been subdued, but not broken."

That simple breathing can have any influence, except perhaps one slightly sedative, seems incredible. The animal and the man both possess the power of burning carbon in the lungs. They both create the poisonous carbonic acid gas. It is possible that by breathing this gas again into the lungs of a spirited horse, beating rapidly and high with fire and courage, they may become loaded and heavy—may feel the sensation of choking by the fumes of charcoal; and so the animal's courage may be cooled so much as to tame his vicious propensities. And even this temporary sense of his inferiority may exercise an influence on his subsequent character for life. But if a daring courageous man had energy and determination enough to approach a vicious horse so near as to breathe into his nostrils, might not that act alone convince the horse of his subjugation to mental and moral power, and so subdue his vices and vicious propensities? To this, or some such principle, may be attributed the taming of the vicious horse, and the influence applicable to the quieting of a horse may be found equally efficacious for a donkey!

To mental and moral power is the taming of all animals much more attributable than to the material. There can be no doubt that the wonderful acuteness, discrimination, and almost reasoning powers possessed by the horses of the Circus are mainly owing to the training of the *intellects*, though a painfully revolting feeling associates itself with the consideration caused by reflecting on the cruelties attending their education.

CHAPTER XV.

VICES AND THEIR REMEDY.

INDEPENDENTLY of ordinary and general restiveness, there are certain *vices*, peculiar to individual horses, of a very annoying character, and productive of very unpleasant consequences both to the animal and his owner. But RESTIVENESS is, after all, the great and giant evil of horses. It sometimes manifests itself by the animal standing stock still, sometimes by backing, and sometimes by rearing instead of taking the weight. The cause of it generally is their being spoiled by their breakers. Sometimes a farmer will breed his draught-horses with a strain of blood, in which cases they have too much spirit for a steady dead pull. Generally, however, it is violent and brutal treatment in breaking which ruins the horse. Sometimes they are restive in riding. On this the author of "Hints on Horsemanship" says—

"A common error, both in theory and practice, exists with regard to the restive horse. He is apt to rear sideways against the nearest wall or paling. It is supposed that he does so with a view of rubbing his rider off. I do not give him credit for intellect sufficient to generate such a scheme. It is, that when there the common practice is to pull his head *from* the wall. This brings the rider's knee in contact with it; consequently all further chastisement ceases; for were the rider to make his horse plunge, his knee would be crushed against the wall. The horse, finding this, probably thinks it is the very thing desired, and he will always again fly to a wall for shelter. Instead of *from* the wall, let the rider pull his head *towards* it, so as to place *his* eye, instead of your eye, against it. Continue to use the spur, and he will never go near a wall again.

CRIB-BITING.—This very disagreeable vice has been pronounced in a court of law to constitute unsoundness. It consists in a violent extension of the neck, an attempt to grip the manger with the teeth, and, with a convulsive action of the throat, a sucking-in of the air. Crib-biting is decidedly *infectious*,—for one horse will, to a certainty, contract the habit from any other who possesses it, if placed in the stall next to him. The effects of this vice are serious. Besides the injury to the teeth, and the waste of corn (for the horse will usually bite with a full mouth), much loss of *saliva* takes place, by which digestion is, of course, impaired; *flatulence* is also produced by the inhalation of air, and a crib-biting horse is never so well up to his work as another.

Many remedial measures have been tried, but to little or no purpose. Among these are, covering the edge of the manger with iron, with sheep-skin, with tar, or with aloes. A strap round the throat has also been recommended,—it cures crib-biting, but usually produces, if possible, a worse affection, viz., *roaring*.

Turning out to grass for a few months commonly succeeds with young horses; and Maxwell says that he had horses cured by turning them into loose boxes. Youatt recommends a muzzle with bars across the bottom, sufficiently wide to allow the horse to get at his corn, but sufficiently close to prevent his getting hold of the manger. Perhaps the advice whispered in the ear of Nimrod, by an old sportsman, is the best we can give—"Never buy a crib-biter; he is always getting worse." To this we may add,—if you have one, get rid of him.

WIND-SUCKING.—The horse bends his neck, draws his head inward and downward, and *sucks* in the air. The effects are the same as those produced by crib-biting. I have induced several persons, whose horses were affected with this nasty vice, to try Mr. Youatt's remedy, and it has been invariably found successful. It consists in attaching to the head a leathern strap, with spikes pointing towards the neck. When the horse draws in his head, preparatory to sucking, the spikes prick his neck; a new and sudden impulse is given to his ideas, and the attempt at inhalation of air is abandoned.

SHYING.—This vice, which will often occasion the unseating of the best rider if taken in an unguarded moment, proceeds from several causes, and upon the individual cause the curative treatment must depend. If the cause be imperfect sight, gentleness and coaxing are necessary. The use of whip or spur will only make matters worse; but if the horse be treated with gentleness, and coaxed up to examine the object which terrified him, he will soon learn to place confidence in his rider, and his shyness will gradually disappear.

If the cause be mere skittishness, or *affectation*, severity is also objectionable. Keep the *mouth* well under command, ride on without more notice of the matter than an occasional touch with the spur; and when the animal perceives that his pretended fright has failed to elicit any notice, he will soon tire of his performance.

If the cause be *inexperience*,—the being unacquainted with the many new objects the animal encounters,—the remedy is the same as that just described, always feeling the mouth gently, remembering to avoid all harshness, and to treat the animal precisely as you would a timid child.

Mr. Laurence says—"These animals generally fix on some particular shying butt; for example, I recollect having, at different periods, three hacks, all very powerful; the one made choice of a windmill for the object or *butt;* the other a tilted waggon, and the last a pig led in a string. It so happened, however, that I rode the two former when amiss from a violent cold, and they paid no more attention to either windmills or tilted waggons than to any other objects,—convincing me that their shying when in health and spirits was pure *affectation*—an affectation, however, which may be speedily united with obstinacy and vice. Let it be treated with marked displeasure, mingled with gentle but decided firmness."

The horse will sometimes prove restive and obstinate when mounted by a strange rider—by one with whom he is unacquainted. If the party be unused to riding, he had better give up the attempt; but if he possess a knowledge of the art of *sitting a horse*, he may speedily let the animal know that he is his master, and it is astonishing what an amount of *respect* this will produce. A few masterly touches will usually sober a horse at once.

KICKING THE POST.—Another vice of the horse is *kicking the post* of the stable, and sometimes the wall itself; or a low manifestation of the same tendency is stamping in the stable. It often originates in the horse having itching humours in the feet. It may commence at a period in life when it soon becomes a habit, and not only destroys the fittings of the stable, but injures their own feet, and disturbs the rest of other horses. If cured at all, it must be at the first manifestation. Let the foot and leg be well examined to see there is no heat, itching, or cause of irritation. Take off the shoe and foment well with hot water—the hand being the criterion of its proper heat,—and give a ball. A little blood may be extracted; and, as soon as fit, put the horse to work, in the plough if possible, or on the grass; and double or treble the exercise, if he be an idle horse. As it is usually one leg only on which he strikes, let the stable post be well covered with dry whins. This will often be a cure, a ready correction of the fault, and also a deadener of the sound. If this does not succeed, remove the post of the stable on the kicking side, three or four feet nearer to the head, and leave the remaining stall unoccupied. Such horses are always best in a loose box, and, though this will not cure the tendency, it will be an alleviation. A horse will sometimes kick until he breaks his own leg, so intense and determined is the mania.

BITING.—Some horses are addicted to biting; and no wonder. They are teased and irritated till they begin it in play, and at last acquire it in earnest. For this, when established, there is *no cure*. You may correct and coax, and correct again; but correction is of no use. A resolute determined, firm-handed groom, will sometimes overcome it at the first manifestation; but if it once becomes a habit, it is irremediable. Hard and constant work will alleviate it; but a horse once a biter is never safe.

KICKING is another still more dangerous vice—only there is generally some indication of it before it comes. A kicker should never be approached but by his own groom. A bold stand, close to the horse, will diminish the severity of the blow; and it is said that no horse will kick if you have *firm* hold of his tail. A mild, gentle treatment, will often accomplish what severity will not. Horses should never be approached without being spoken to, and never while they are eating their corn. If a horse is a confirmed kicker, and must be kept, a door may be opened in the stable so as to approach by the head. It is dangerous, however, to have such a horse in a stable at all.

WASTING THE CORN is the last vice to which allusion will be made here. Some horses are in the habit of actually throwing it out of the manger with their noses. A few cross-bars over the manger will usually remedy this; and if they gulp down great mouthfuls from mere greediness, the corn should be spread as thin as possible over the manger. The horse will sometimes waste chaff in search of the oats; but the best mode is to give *crushed* oats mixed with clover chaff.

CHAPTER XVI.

PREVENTION OF DISEASES ARISING FROM MISMANAGEMENT.

THAT it is better to prevent disease than to cure, is a truism so applicable to every evil of life, as to have run into a proverb having all the force of a self-evident truth. But that the prevention of disease is *easier* than the cure is equally correct. Disease is a derangement, either of the functions of the system, or a disorganisation of these organs themselves. Hence all diseases must have a cause. It may be a constitutional tendency in the animal itself, a weakness or a defect, or it may arise from mismanagement. The latter is nearly always the case. There may be some weakly horses with diseased tendencies; yet these generally arise from hereditary defect, or from mismanagement of the mother or offspring, in gestation or infancy. But by far the greatest amount of diseases arise from the reckless mismanagement applied to the animals themselves. A few of these may be mentioned :—

One of the causes of disease, and indeed a very unsuspected one, is the lead imbibed, when drinking, from the passage of their water through much lead pipeing. Mr. Cuming, V.S. of Edinburgh, found a most remarkable and intractable disease prevalent, resembling staggers or head disease. Animals in health at one period would be dead in thirty to thirty-six hours afterwards. In twelve years, fifty fatal cases occurred in a circuit of three miles. He opened one of the subjects which had resisted all the influence of his medicines, and a quantity of carbonate of lead, in small particles, was found in the stomach. He had some of the subjects exhumed, which had been interred, and the same cause of disease was apparent there also. The animals so diseased have a tendency to eat bones, rags, bricks, tiles, &c. From this it is evident that greater care is necessary in conducting water than is generally considered needful, especially as it is found that the softer and purer the water, the more is the lead pipe decomposed and rendered dangerous. Of all conductors perhaps *glass* will now be found the least objectionable, if not the cheapest medium.

A diseased appetite is often first induced by over-confinement. The horse when at liberty will eat the grasses to the very root. With them he imbibes the alkaline soil; but if he never passes out of the stable, he needs some such substance, and hence he will begin to gnaw the stalls, the mangers, and the gates,—a tendency quite distinct from crib-biting, but often productive of it. Nothing is more refreshing to a horse than a run in a fallow field, nor anything more conducive to health than occasional liberty. This should be systematically afforded to all horses, even the most carefully groomed and artificially attended.

The use of salt in dietetics is most sadly neglected. Some parties run to the opposite extreme, and mix salt in some given proportion with all their food. Now, depraved and perverted as many of the instincts of the horse have become from domestication, still it is by far the best teacher of the quantity of this material necessary for health. Let him have a block of rock salt in his manger, and he will soon find it out, and take as much as he pleases. It will keep the stomach in tone, and vastly promote health.

Great care and caution are necessary in the changes of food. A horse taken up from the soft grass of autumn, is often put to barley straw. It is a new pabulum. The horse eats his fill, nay, even greedily,—the stomach has a new duty to perform. It refuses to act. The horse begins to be uneasy—to paw—to lie down and get up—to look at his sides. He is supposed to have gripes, and cholic medicine is given. He gets no better,—inflammation sets in, and he dies.

The veterinary surgeon is the only person who ought to be intrusted with his case. But the stomach must be emptied. Injections are always safe, and generally successful. They give time, keep off inflammatory action, relieve pain, and wash out the indigestible matter.

Another similar cause of disease is that of allowing the horses to have free access to the chaff of the winnowing machine. This is often blown out of doors into a garth or paddock. The horse eats his fill of this new food, and the same sad consequences we have alluded to above, deservedly follow—from a similar cause. A little of this mixed with his mashed corn would have been very advantageous: but given, as we have supposed it to be, it becomes dangerous.

The usual allowance of water, *after* a full meal of food, is often productive of injury. Mr. Carmichael, whose writings during his life were of so much value, gives a very striking instance. A valuable farm horse in high health and condition, was served at mid-day, during a very busy seed time, with a quantity of bean chaff—or the hulls and leaves blown off in winnowing, called *keavings* in Scotland and the north—which, though essentially flatuous in their nature, are safe for an evening or idle day's meal; but in the instance he describes they were given immediately after a feed of oats, and the horse have ing had after them his fill of water. He had not worked long before he manifested symptoms of violent pain, and in two or three hours died of a ruptured stomach. Horses will also suffer in a similar manner from a large feed of cold raw potatoes while hot,—from eating wheat, sometimes given by careless and roguish servants,—and even from clover heads, &c., when the horse is worked immediately after the stomach is entirely distended. Frost-bitten clover will sometimes produce disease and death.

Professor Dick mentions a case in his lectures, strongly illustrative of the great injury arising from over-feeding with very rich food. One owner lost twelve horses in an incredibly short space of time from this cause. The Professor knew that chemical action could not take place in an overloaded stomach; he recommended one half of the food to be given at a time,—it had the desired effect. It must be admitted, however, that the injury to the horse is generally from the opposite cause, namely, under-feeding.

Post-horses, and such as are required to perform fast work, are more liable to attacks of diseases of the brain, the nerves, and the lungs, simply because their work consists of rapid and powerful exertion;—the farm horse, the animal of long and steady exertion, to gripes, inflammation of the bowels and stomach, staggers;—results, as I shall presently show, of a management unsuited to the character of the labour we require from them. The stomach of the horse is remarkably small—smaller in proportion to his size and the quantity of food he requires, than any other domestic animal. Nature intends for him a moderate supply of nutritious food, and that at short intervals,—wherein he materially differs from the ox, whose capacious stomach will contain food which will not be digested for hours. The post-horse, the hunter, and the carriage horse, have food of the most nutritious description; and the time during which they are worked is necessarily short, owing to the extreme exertion required. They return to their food, and, although their appetite may for a time be impaired, and their stomach and bowels affected by the general debility of the system, yet they recover their tone as soon as the rest of the frame admits of their taking food.

The farmer's horse, on the contrary, has food of a less nourishing nature; his rack is filled with straw, and, at best, with clover; the ploughman rises early, gives him a feed of corn, and leads him to his work, where he continues for seven, eight, and even nine hours, and his whole day's work is frequently completed before he is allowed to eat.

Of the best means of preventing these diseases in farm-horses, we will now treat. We have attributed the peculiar liability of farm-horses to these diseases to mismanagement, with the exception of certain instances of peculiar formation of the animals; for, although the farmer must necessarily work his horse longer hours than the horse of rapid work can be worked, there is no necessity for depriving the animal so long of food. No horse should work more than five or six hours without a bait. In all these cases, whether proceeding from the nerves in horses where speed is required, or from stomach diseases in the case of draught-horses, the cure, as has been hinted, must generally be left to the veterinary practitioner, whose chief object should be to empty the stomach. In severe cases an ounce of laudanum and a drachm of pounded ginger, in a quart of warm ale, may be used with probable success in cases of gripes.

Mr. Carmichael, before mentioned, alludes also to the injury arising from horses eating damp or mouldy straw; and with equal force on the danger of the food, when cooked or boiled, becoming sour or stale before it is given. If there is the least neglect, or want of cleanliness, this must be the case; and he who gives cooked food to horses, and suffers it to get soured, must immediately *scald* out all the mangers and vessels, and dust them with *lime*. This will at once annihilate the infection.

These are but a few of the diseases arising from mismanagement, but they are the most common; and a little care, exercised in time, will often prevent a long veterinary bill.

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CHAPTER XVII.

DISEASES AND THEIR REMEDIES.

This is not a work on the veterinary art, and therefore little will be expected on the medical or surgical treatment of the horse. In fact, even were it practicable in this work to give such a dissertation, it would be of no manner of service, but rather the reverse. The horse is too valuable, too *costly* an animal, to be rendered at any time the subject of blind quackery. In the preceding pages I have probably done more good than I could effect in ten volumes on the subject of disease; as I have shown, I hope, the means by which the access of disease may in many cases be *prevented*—a subject much more within the range of a horse-keeper than curing them.

There are still, however, simple cases in which you may advantageously become your own horse-doctor; and therefore I must give you some instruction relative to these.

BLEEDING.—Every man who keeps horses should know how to bleed, as timely bleeding will, in many instances, avert a dangerous fit of illness. Colds (caught by being suddenly turned out from a hot stable to a damp pasture, or in cold or wet weather, from being left out at night under similar circumstances) may lead to serious results, and, amongst others, to fever, which may terminate fatally. Prompt bleeding will often avert this; and perhaps, by the time a veterinary surgeon could arrive, the disease might have passed to another stage, in which bleeding would not only be too late, but improper. I shall therefore give instruction for bleeding.

In bleeding, the *lancet* is doubtless preferable to the *fleam*, but *only in the hands of the veterinary practitioner*. The place for bleeding is usually the jugular vein. The horse must be blindfolded, and the coat along the course of the vein must be smoothed. In operating, you must have the head of the animal turned from you by an assistant; then, with the fingers of the left hand, which holds the fleam, press upon the vein just sufficiently to bring it well into view. The best point is about two inches below the junction of the two branches of the jugular near the angle of the jaw; place the fleam exactly on the course of the vein, and strike smartly, but not too violently, on the back of the fleam. Bleed always from a *large orifice*, and for this purpose a large-bladed fleam is preferable; for a small quantity of blood, rapidly abstracted, will produce more valuable effect than a large quantity gradually drawn. When enough of blood has been taken, remove the pressure, bring the lips of the wound together, pass a pin through them, and roll some tow or silk thread round it, over the extremities of the pin. Secure the horse for a couple of hours, so that he cannot rub this off against the manger. For local purposes, blood may be abstracted from any superficial vein in the same manner. There is a *spring-lancet*, to be obtained from the cutler, which is greatly preferable to the fleam.

PREPARING A HORSE FOR PHYSIC.—Mr. George Holmes, late of Thirsk, furnished the editor with the following remarks, which are well worthy the most complete confidence. They will be found useful in preparing and treating a horse during physic, viz.:—

Treatment 1st. He should have cold bran mash for about two days before any physic at all is given; and, if fat or gross, it will be well to keep him short of hay the night previous to physicking.

2nd. The physic must be given about eight or nine o'clock in the morning, upon an empty stomach. About an hour after, the horse may have water and cold bran mash with oats. At four or five o'clock in the afternoon, he may have chilled water, and a little warm bran mash, with hay, if he will take it. Early next morning, the horse should have as much chilled water as he can take; and about eight or nine, if the physic has not operated, he should be walked out for ten or twenty minutes; but should the physic have previously operated, he must be kept still and quiet.

3rd. The day after the physic has operated, the horse should rest from all work; but should the physic continue to operate more than two days, means must be had recourse to for stopping the purging; otherwise there will be more harm done than good.

Lastly, during physicking, the horse must by all means be kept warm.

DRENCHING.—You should also know how to administer a DRENCH. Never use a *bottle* for this purpose, as the horse might bite away the neck, and either swallow a portion of the glass, or otherwise injure himself. Have a cow's horn for this purpose, the larger end cut in a slanting direction. Pass a halter into the mouth, and let an assistant keep the head elevated, by means of a stable-fork, as high as he is able. You then draw forth the tongue with your left hand, and, with the right, introduce the small end of the horn into the mouth, gently of course, over the tongue. A turn of the wrist will then empty the contents into the mouth. A simultaneous movement withdraws the horn, and lets go the tongue. Keep the head up till all is swallowed; and if the horse retain some of the drench obstinately in the mouth, a slap on the nose will generally compel him to swallow it. Do not try to give too much at once, Be sure to introduce the horn far enough, and to turn and withdraw it quickly, but without hurting the gums or lips of the horse.

BALLS are given in a somewhat similar manner; but the head does not require to be held so high.

ACCIDENTS.—There are also some accidents which the proprietor of a horse may himself with safety look after. For instance, BROKEN KNEES. When a horse falls and lacerates his knees, your first object should be, by careful washing, to remove all foreign substances from the wound. In the next place, endeavour to ascertain whether the joint cavity has been penetrated. *You* must not use a *probe* for this purpose ; but apply a poultice of linseed-meal,—and when, in about eight or ten hours afterwards, you take it off, you will see a yellowish, glairy fluid effused upon it, if the joint have been penetrated. Should this have been the case, send at once for the veterinary surgeon. When the joint has not been penetrated, get the lips of the wound together, and keep them so by a compress and bandages, which need not be renewed till the third day. The earlier the wound is closed the less mark will be left on the part.

LAMENESS.—It is sometimes difficult to detect the *cause* of lameness, especially of the anterior extremities; I would, however, say that it is a safe criterion to watch how the horse moves. If he lift his feet, the *shoulder* is not the injured part; but if the *shoulder* be affected, the pain that any raising of the foot will occasion will cause him to drag the toe along the ground, instead of attempting to raise the foot. In *shoulder-lameness* you can do nothing but get the surgeon as soon as possible. In the other case, examine the *foot*, as found-nail or bad shoeing may be the exciting cause.

STABS OR CUTS.—Let your first care be to remove the cause, if any such remain in the wound. Send at the same time for the nearest veterinary surgeon. If there be much effusion of blood, strive to check it as much as possible, while waiting that gentleman's arrival. This may be best done by producing pressure on the bleeding vessels, and effusion of cold water. In some cases a solution of alum, or any other harmless astringent, may be useful. If the bleeding has ceased, commence a continuous and vigorous fomentation. It alleviates pain, arrests febrile symptoms, and brings the wound into a suppurative state. The very worst wound may often be cured by this simple treatment, instead of hot oils and violent stimulants, which kill more horses than they cure. Pricks in the sole are a very frequent cause of *Quittor*, and should, therefore, be timely looked to; but observe the manner in which the farrier removes the shoe for the purpose of examination. Do not suffer him to take it off *violently*. Each nail should be *separately extracted*, and the shoe then removed; otherwise the affair will probably be made worse. When the shoe is thus *gently* removed, the appearance of matter or moisture on some particular spot will usually indicate the seat of pain.

Speaking of *farriers*, it may not be amiss to add, that many cases of lameness are induced by *bad shoeing*. Want of space renders it impossible for me to enter into a treatise on the *foot of the horse;* but it may be well to state, that the reader can purchase separately many excellent works on that most important subject. My own advice is to send your horse always to a forge that is under the superintendance of a *veterinary surgeon* of respectable standing. It has been the practice at some forges to pare the foot, and make a red-hot shoe do the rest of the fitting. The late Colonel Thornton observed once that a hot shoe had been applied to his horse's foot—"Tell the smith," said he to his groom, "if he dare to use a hot shoe to a horse of mine again, I will apply one to his." The Colonel caught poor Vulcan in the act shortly after, and literally fulfilled his threat.

Colic attacks a horse in many instances very suddenly, and requires immediate relief. Send for the veterinary surgeon; but, pending his arrival, give, as a drench, about two ounces of oil of turpentine with six drachms of laudanum, in a pint of castor or linseed oil, *warm*. After the spasms have disappeared, rub the horse dry, the belly and flanks especially. I should not, however, recommend the horse to be trotted about, as some do. It is better to let him rest. Give no *spirits*, *pepper*, or other *stimulants*.

There are often sad mistakes made in giving the colic drink to horses suffering from indigestion, or a tendency to inflammation of the bowels. The one is a simple attack, which it is desirable to meet at once; the other a gradual undermining of the vital powers, which a veterinary surgeon alone can cope with. Now the medicine for the one is poison to the other. Hence it is important to discriminate between the symptoms. Youatt gives a table which the horse-keeper ought to get off by heart:—

Symptoms of Colic.	Symptoms of Inflammation of the Bowels.
Sudden in its attack.	Gradual in its approach, with previous indications of fever.
Pulse rarely much quickened in the early part of the disease, but evidently fuller.	Pulse very much quickened, but small, and often scarcely to be felt.
Legs and ears of the natural temperature.	Legs and ears cold.
Relief obtained from rubbing the belly.	Belly exceedingly tender, and painful to the touch.
Relief obtained from motion.	Motion evidently increasing pain.
Intervals of rest.	Constant pain.
Strength scarcely affected.	Rapid and great weakness.

Fits.—You had better, in this case, send for the surgeon at once, if your horse be valuable; if otherwise, get rid of him.

Glanders.—In *purchasing* a horse, be very careful to ascertain that he is unaffected with this truly terrible disease, for which there is no cure, and which has, in so many frightful instances, been communicated both to man and other animals. Notwithstanding the awful nature of this disease, however—not a whit less dreadful than HYDROPHOBIA—dealers at fairs and other places will frequently endeavour to pass off a glandered horse upon an unwary customer. Not long ago an instance of this fell under my own observation at Fieldston horse fair, in the county Meath. The trick usually resorted to is, stimulating the nostrils till the horse has snorted away all the matter lying in them, and then, by injections of an astringent nature, producing a temporary suppression of the discharge. Others cram a pledget of tow up the nostrils. These tricks may be detected by the animal's uneasiness, tossing of his head, efforts to sneeze, the red and vascular appearance of the interior of the nostril, but especially by the *fetid breath.*

FARCY and GLANDERS are, to a considerable extent, connected; as each, when neglected, or proving obstinate, is apt to run into the other. Like glanders, farcy is highly contagious, but is not, like that disease, wholly impregnable to the attacks of science. When the disease first appears—and its appearance is familiar to all about horses—give an aperient drench. If it be the *button-farcy*, touch the *buttons* with the extremity of a hot iron. If you have no budding-iron by you, the top of an Italian iron, such as laundresses use, may be made to answer. Examine the sores daily, and as soon as they begin to slough, touch with a solution of a drachm of corrosive sublimate, in an ounce of spirit of wine, to which is added two drachms of creosote. Give internally a ball daily, composed of corrosive sublimate, twelve grains, two drachms of powdered gentian, one drachm of ginger, and one ounce of powdered brimstone. As soon as the mouth begins to look affected by the mercury, or the animal is violently purged, omit the corrosive sublimate, but continue the remainder of the ball. Keep the animal in an airy situation, but one not exposed to draughts or damp, and feed on green meat, such as parsnips and carrots especially. These roots possess *sweetening* qualities of a high order.

LAMPAS, or swelling of the *bars*, or vacant space between the tusks and grinders—an affection very common to young horses when teething—will generally yield to mild alteratives and cooling drinks; but if it do not, a few slight incisions with a lancet or penknife will produce relief, taking care to confine your scarification to the *outside edge*, so as to avoid the palatine artery and vein. Do not permit the bars to be *fired.*

STRANGLES, also a common disease of young horses, presents symptoms so like those of glanders, as to be sometimes confounded with that disease. Strangles, however, may be distinguished from glanders by the formation in the former of a continuous tumour in the hollow under the lower jaw. The treatment consists in bringing this swelling to a head, by means of a blister. As soon as it is soft on the top, it should be opened, and that by *three incisions*. The sore may then be dressed for a few days with emollient ointment. Cooling drinks, as cream of tartar and nitre, may be given with advantage. If there be appearance of fever, or affection of the chest, send for the surgeon, as the treatment is now beyond your skill. This, however, is rarely the case.

POLL EVIL, a swelling of the poll, caused by the horse striking it against the lower edge of the manger, when raising it suddenly after stooping or by pulling upon his halter. In most cases, all attempts to prevent suppuration are useless, and I think it best to endeavour at once to hasten it. Then open the tumour by means of a seton, which should be passed in at the top, penetrate through the bottom, and pass out at the side of the neck, just below the abscess. Foment with warm water, and keep the parts clean.

ROARING, most generally the consequence of malformation of the larynx, but sometimes occurring as a sequel to strangles, and sometimes arising from palsy of the muscles connected with the larynx. The use of a strap for the cure of crib-biting is also an occasional cause. I know of no cure, and am disposed to think that, in all cases, *roaring* is beyond the reach of treatment. I would also advise you not to *breed from* a roarer, as this defect is, in many cases, transmitted to the progeny.

SADDLE-GALLS might have been prevented by using properly adjusted and well stuffed harness or collars. Rest the horse, bathe twice daily with warm water, and after each bathing dress with spermaceti ointment.

INFLAMMATION.—When you find a horse dull, listless, off his feed, coat staring, chest and nose hot, extremities cold, some attack of an inflammatory nature is at hand. Bleed from a large orifice until you find the pulse sensibly diminish; administer a purgative, but meanwhile let the veterinary surgeon be sent for with all speed.

SPAVIN.—An enlargement of the little sacs of mucus placed between the tendons to prevent friction. The most common place for this to occur is at the inside of the hock, at the bend. This is called *hog-spavin*. When this becomes so much enlarged as to produce compression of the vein passing over it, between it and the integuments, the vein shares in the distension, and it becomes *blood-spavin*. In general, a spavined horse is lame, but not invariably so.

Blistering, or perhaps *firing*, is the only cure on which I place any reliance.

"DISTEMPER," or more correctly epidemic catarrh, generally commences in shivering, then heat of mouth and nostrils, cough, red and heavy eye, redness of the membrane of the nose. From the commencement, there is generally, but not invariably, a discharge from the nostrils, which, in neglected cases, becomes fetid and ropy. This disease requires too much judgment, and too much knowledge of the varied treatment called for in each different stage, for me to give you any advice further than this: if you have detected it at *its very commencement*, bleed copiously, and give a strong purgative,—the veterinary surgeon being also sent for. Do not suffer yourself to be made a victim of quacks. There is no *specific* for this disease, and, under improper treatment, it is more frequently fatal than otherwise. The early attendance of a veterinary surgeon in this disease is the more desirable, as its early symptoms are extremely like those of

MALIGNANT EPIDEMIC, which latter disease rapidly runs into gangrene, and terminates in death; and the former disease frequently passes into the latter, when not properly combated at first.

BROKEN WIND.—Incurable; but may be alleviated by *condensing the food*—reducing as much as possible the *quantity* necessary to be consumed, by giving the necessary nutriment in as small a compass as you can; as, for instance, more oats and less hay. Keep the bowels moderately open, and never work upon a full stomach. Feeding upon carrots will also be found beneficial.

WORMS.—The symptoms show themselves in the appearance of the vermin in the excrements, or creeping out of the anus. Give two drachms of tartaric emetic, with twenty grains of powdered ginger, every morning, *fasting*. When there appears much irritation about the anus give a strong dose of aloes, and *inject* linseed oil.

JAUNDICE, known by the yellowness of the eyes, mouth, and of all naked portions of the skin, with high-coloured urine, dullness, and loss of appetite. Bleed; give twice daily, until the bowels have been freely opened, two drachms of aloes, with one drachm of calomel, warm white-water or thin gruel. Keep the stable cool; feed on green meats.

DIFFICULTY OF STALING.—Give plenty of warm drink; linseed boiled in plenty of water; turpentine made into a ball with linseed meal; half an ounce of turpentine and half a drachm of ginger, with as much of the meal as is required to form the ball.

IN PROFUSE STALING (the opposite of the preceding) the treatment should be bleeding and purging; every kind of counter-irritation, astringent medicines; and feeding on carrots.

WINDGALLS.—An enlargement about the fetlock, caused by the enlargement of the mucus sacs, spoken of already in reference to spavin. Treatment the same.

RINGBONE.—A deposit of bony matter on the cartilages and bones of the pastern and foot. The only cure is *firing*, and even that is only occasionally successful.

THOROUGH-PIN, analogous to windgalls and spavin, being a similar enlargement above the hock, between the extensor muscle of the hock and the flexor tendons of the foot. Mode of treatment same as for windgalls.

CURB is the consequence of a strain of the tendon or its sheath, or the circular ligament which holds it in its place. It appears under the form of an enlargement at the back of the hock, two or three inches below its point. Bleed from the subcutaneous vein nearest the seat of injury; use emollient fomentations. Firing is sometimes, but not invariably, advisable. A veterinary surgeon must judge of this.

STRINGHALT.—Cause and cure alike obscure. It is supposed to be an excess of nervous energy, and is usually produced by effort for heavy work. There does not appear to be any specific for the complaint.

GREASE commences in inflammation of the skin of the heels, proceeding to excoriation, cracking, ulceration, and fungus. Cleanse well with soft-soap and water; use a solution of alum, or sulphate of copper, as a lotion.

CORNS.—Resulting from bad shoeing, and severe work on hard roads. The effort of nature to counteract this produces a horny substance, which presses on the sensitive part of the foot, and causes lameness. Cessation from labour, and careful cutting out of the corns, with gradual work on soft ploughed land, will usually eradicate these.

OVERREACH.—The bruise given by an awkward blow of the toe of one foot against the heel of another. Cleanse, and fasten a pledget of tow, dipt in friar's balsam, npon the wound.

The preceding hints are all that would be likely to aid the amateur in the treatment of his horse. But whenever an animal worth saving displays symptoms of illness, send, without any loss of time, for a professional VETERINARY SURGEON.

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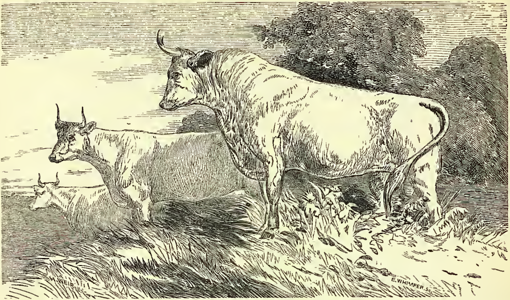

H. WEIR.
E. WHIMPER, Sc.

WILD CATTLE AT CHILLINGHAM PARK.

THE COW:

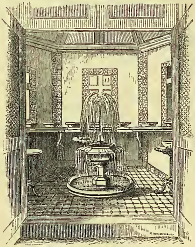
DAIRY HUSBANDRY AND CATTLE BREEDING.

BY M. M. MILBURN,

AUTHOR OF PRIZE ESSAYS OF THE ROYAL AGRICULTURAL SOCIETY
OF ENGLAND.

With Illustrations by Harrison Weir.

A NEW EDITION.



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PREFACE.

The Author of "The Cow" has gone over the first edition of the work, and made a few alterations, and several additions, which he believes bring the Book up to the present standard of knowledge. To those who have favoured him with their very flattering encomiums, both in the public press and also in private, he begs to say he has spared no pains to make the present edition of the Treatise as useful as possible to the Breeder, the Feeder, and the Cow-keeper.

Having undertaken, and published, a similar Treatise on the Sheep, he ventures to assure his readers that the same care has been exercised, and everything within his knowledge has been made plain, connected with the Flock and Shepherding. In preparing this work much valuable information which he possessed on the Management of Sheep in Australia has been communicated.

M. M. M.

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THE COW:

DAIRY HUSBANDRY AND CATTLE FEEDING.

CHAPTER I.

INTRODUCTION.

To no race of animals is man more deeply indebted than to the herd of the field. They not only cultivate the land, like the horse, but supply him with food in various ways; and even after death they furnish him with many of the important necessaries of life. While living, they provide him with milk, cream, cheese, and butter; and after death (unlike the noble horse, which dies but for the maggots and the hounds), they supply the food which has become associated with our national peculiarities, and which is one of the most nutritious of the aliments of life.

Their hide provides shoes for our feet, and trappings for our horses; their horns, combs and ornaments: their hoofs supply glue and gelatine; while their bones afford the handles for our knives, and many useful articles of manufacture. The refuse of these, again, returns to the soil as a valuable manure.

From the earliest periods of antiquity, the herd of the field have had attached to them a high degree of importance. In Egypt, the most civilized country of the earth, divine honours were paid them, and they had their priests and their obsequies. Even where a more enlightened faith prevailed, they were among the first religious sacrifices offered to God, and the first accepted. The herdsman, too, as well as the shepherd, was a patriarchal king; and his riches chiefly consisted of cattle.

It is not certain when cattle were first introduced into this island. Whether they inhabited it when it was severed from the continent of Europe, or whether they were brought from abroad, is absolutely unknown. Neither have the disputants at all determined which of the tribes of cattle that now exist had the honour of being the primeval race. Nor can it, perhaps, ever be finally determined whether, if introduced, they came over in a state of domestication. One thing, however, is certain—that we have in this country several very distinct tribes of animals, differing in their features and characteristics in many very important particulars; some so completely domesticated as to be affectionate, and even companionable, and others as shy and untameable in their nature as the wild deer of the forests. Neither is it easy to say whether the latter are the primitive race, or whether they are an accidental variety, permitted to live in their native wildness, as a contrast to the gentle domesticated creatures, such as our short-horns, which probably owe their docility to continual training, through a long series of ages.

Tracing our domestic breed back to the Bison, or Wild Ox, known to the ancient Greeks and Romans, but driven away from central Europe by the pressure of population, we find they now inhabit the wild morasses and forests of Lithuania, and the Circassian range, where they appear so wild and ferocious as but little to resemble, except by marks too unmistakable to overlook, the quiet and gentle kine, which low around our homes with a social attachment. Attempts to domesticate them have been hitherto unsuccessful; and, when partially effected—as it has been by Gilberts—they still seem to have an aversion to our domesticated cattle, which is highly indicative of their half-educated state. The bison is found also in British India, in Western Asia, and on the American continent. The race is hunted in most of these countries for their skins, and now, perhaps, for their flesh and their bones.

The herds of these bisons are usually very formidable in numbers. They associate together for mutual protection. Observing almost military discipline, they move in rank and file, and are led by the largest and fiercest bull. So dense is their column when migrating, that, if one falls or halts, the whole herd will march over him, and trample him to death. So well known is this habit of following their leader, that the hunters take advantage of it. An Indian, attired in a bison's skin, places himself between the herd and a precipice, while his coadjutors nearly surround the herd on the three other sides. At a given signal, they appear simultaneously, and set up a tremendous yell. The herd, seeing no other way open, scamper off in the direction of the disguised bison, who leads the way to the precipice, and retires to some previously-arranged hiding-place. The herd are thus forced down the steep; and, impelled to death by the pressure behind, some hundreds perish.

The Buffalo is another species of wild ox. The race is also widely diffused, being common in India, in Africa, and in some of the wilder or more southerly parts of Europe. It seems more tameable than the bison, and is used for domestic purposes in the East and in Africa. Tho native African buffalo affords hunting sport of the wildest kind. Having also a bull-leader, he will rush headlong against any opposing enemy. Sometimes life is sacrificed in these exciting but terrible engagements.

The wild cattle of this country, though differing in conformation, have many habits in common with both these animals. They are kept in their native purity in the park of Lord Tankerville, at Chillingham, in Northumberland. A few are also kept in Scotland, in a park of the Duke of Hamilton's, at Chatelherault, in Lanarkshire; but the latter have a less certain pedigree. The former nobleman, in a communication to the Society of Arts, gives a very interesting account of their characteristics and habits, and allocates to them the palm of being the aboriginal cattle of the island. That the original breed, or at least some early breed of cattle, have been very large in size, is evident from the fossil bones found in bogs; yet a smaller kind has been found in Cornwall, with a kind of horn more resembling the cattle of the Duke of Hamilton. Fitzstephen, who lived in the twelfth century, alludes to the wild bull of the woods as having its residence in the largo forests near London. Guy, Earl of Warwick (whose contest with the Wild Dun Cow is commemorated by the animal's skull being still preserved in Warwick Castle), evidently had an encounter with a monstrous animal of the wild breed. Hollinshed also speaks of Bruce, in the fourteenth century, being nearly killed by a wild bull in the forest of Caledon; and from his attendant having rescued him, the well-known name of "*Turnbull*" originated.

So recently as the sixteenth century, it seems, these wild cattle were common in the Callender or Calder woods. Conrad Gesner describes them, in the quaint legend-language of the day, as "white oxen, maned about the neck like a lion...... This beast is so hateful and fearful of mankind, that it will not feed of that grasse or those hearbes whereof he savoureth a man hath touched—no, not for many days together; and if, by art or policy, they happen to be taken alive, they will die with very sudden grief. If they meet a man, presently they make force at him, fearing neither dogs, spears, nor other weapons."

Tho Chillingham Park cattle—a specimen of which forms the frontispiece of this work—appear to retain all the characteristics of wildness incidental to the untamed denizens of the forest. They hide their young, feed during the night, and conceal themselves as much as possible during the day in the woods, into which they steal, if they appear to be observed. Their usual mode of retreat is, to rise slowly, and set off at first in a walk, then a trot. They seldom begin to gallop till they have placed a hill or rising ground between themselves and the observer. "When they come down into the lower part of the park," continues his Lordship, "which they do at stated hours, they move like a regiment of cavalry in single file, the bulls leading the van, as in retreat it is the bulls that bring up the rear." Another peculiarity is that, when confronted closely, they will at first dash off, remove a few hundred yards, and then all turn their faces, and approach the object of their fear. On any further indications of approach, they rush off, but to a smaller distance, and return nearer the object; and so on every occasion, until the cause of the disturbance departs. They do not seem, however, to have any disposition to pursue. Mr. Geo. Cully states a fact, related to him by Mr. Bailey, of Chillingham, which shows the native wildness of these cattle. He found a hidden calf, two days old, very lean and feeble; but, on stroking its head, it nevertheless rose, pawed with its feet several times, bellowed out, and made a butt at that gentleman, which he evaded. It fell to the ground with the effort, but was so weak as to be unable to rise of itself. The whole herd became alarmed, and rushed to the rescue with great fury. Indeed, so ferocious are the mothers, when they have calves, that they will gore or destroy any one who approaches them.

This strongly reminds us of a similar indication of wildness in the European bison, related by Gilberts. Four young bisons, caught in the forest of Bialoviezeuski, refused to suck a cow; but they were at length induced to suck a goat, which was raised by being placed on a table. Yet, as soon as their hunger was satisfied, they would toss from them with their horns, to a distance of several feet, both the table and the goat.

It is a peculiarity in the wild cattle, that, when any one of their number seems to be irrecoverably ill, the rest immediately fall upon it, and gore it to death.

Now, whether all the great difference in conformation, colour, characteristics, &c., of cattle be due to climate, breeding in-and-in, pasturage, crossing, &c., there is no doubt that, as far as man is concerned, the greatest victory he has won is in the domestication—or education, as it may be called—of the lower animals. To convert a wild and almost worthless animal into a tame, gentle and willing slave, affording diminution of human labour, and yielding, besides, a supply of convenience, comfort, and luxury to man, is no ordinary conquest; but to cultivate one variety for the milk, butter, and cheese, and another for its beef, is a triumph of skill and judgment far surpassing in wonder the mere taming of an animal to domestic habits.

When we revert to the origin of the cattle of this country, and ask ourselves if it be possible that the long-horned Craven cow and the polled Angus, the gentle quiet short-horn and the wild and ferocious breed of Chillingham, can be of the same origin, let it be remembered that the question is one of ample range. Is the rough-maned and bristly bison, with his large fore-quarters and his enormous head, of the same origin as the neat and sprightly Ayrshire cow? The subject is by far too extensive for discussion here; but there does not seem any reasonable doubt for the fact, that, within certain limits, circumstances alone will have a great tendency to change the conformations and characteristics of a species. Thus in cold countries whiteness prevails as a colour, and fur or wool as a coat. In warmer climates the brown prevails as a colour, and the hair as a covering; while in those absolutely hot, the dun seems to obtain as a colour, and the down as a clothing. So easy is the adaptation of organized beings to the state in which they are placed, and so vast is the expansibility of Nature, that she can extend, or shorten, or increase, or diminish conformation, so as to render it suitable to the wants, the happiness, and the existence of the animal. Thus, though the *bones* of the bison and the Galloway may present but small distinction, yet the difference of skin, of mane, and of muscle, would make an ordinary observer startle at the idea of their having a common origin. The skull of a wolf and that of a wild dog of New Holland are all but identical; and it is possible that the influence of pasture may lengthen or shorten the horns—that by breeding from long or short-horned, or from hornless animals, the variety may be perpetuated, till they lose, in the course of ages, many of their original characteristics. It is impossible, for instance, in Essex, to grow the ox to the same size, other things being equal, as in the county of Durham; nor on the Ayrshire hills can he be produced in the same form or stature as in the Devonshire valleys. The Highland Scot is suited to the cold climate of the exposed and stormy north, and the short-horn to the sunny lowland pastures; and who shall say that the God of Nature has not impressed on these created beings the capability of adapting themselves to his plastic handiwork, of developing their tendency to follow the peculiarities of the situation in which they are placed? An elephant can never degenerate into a mouse—a cat never improve into a tiger; but a wild dun cow of Warwick may be the progenitor alike of the thin, spare, feeble-looking Alderney, and the flesh-mountain ox of Durham.

On this subject, Dr. Prichard says:—"In all our stocks of domesticated animals, we see profuse and infinite variety; and in the races of wild animals from which they originally descended, we find a uniform colour and figure for the most part to prevail. Domestication is to animals what cultivation is to vegetables, and the former probably differs from the natural state of the one class of beings, in the same circumstances which distinguish the latter from the natural condition of the other class. The most apparent of these is the abundant supply of the peculiar stimuli of each kind. Animals in a wild state procure a simple and unvaried food in precarious and deficient quantities, and are exposed to the inclemencies of the seasons. Their young are produced in similar circumstances to the state of seedlings, which spring uncultivated in a poor soil; but, in the improved state, all the stimuli of various food, of warmth, &c., are afforded in abundance; and the consequence is a luxuriant growth and *evolution of varieties*, and the exhibition of all the perfections of which each species is capable."

The Chillingham cattle may be the type of all our present breeds—the parent of all the endless varieties of our island.

The importance of the stock of cattle, as affecting the wealth and well-being of this country, is almost incalculable. Mr. M'Culloch estimates the entire number of cattle in the United Kingdom at 5,220,000; and if we add to this the number imported in 1847—in round number, 83,000—we shall have as many as 5,303,000 head of cattle in the United Kingdom in one year, which, at the small price of £8 each, will give an aggregate value of £42,424,000. This number is by no means an extreme one, but rather the reverse. Colquhoun estimated the cattle in England and Wales alone, in 1812, at 5,500,000; and M'Culloch founded his data from Arthur Young's estimate, made in 1779, to which he has only added one-third. As early maturity, and the extended quantity of food produced by convertible husbandry and improved farming, are also to be taken into account, it is probable that, at the present time, the cattle of the United Kingdom amount to nearer seven millions than five.

To afford some idea of the increasing cattle trade of London, it is only necessary to mention, that in 1732 there were only 76,210 cattle sold in Smithfield; in 1830, a period of ninety-eight years, they had increased to 169,907 head; whereas, in 1846, a period of sixteen years more, they reached 210,757 head. If these had but an average weight of 650 lbs., it would give a consumption of the meat slaughtered in London alone of not less than 136,992,050 lbs., without mentioning the quantities of meat sent up as carcasses by the different railways—a trade which is now becoming a great source of profit in several parts of the country.

CHAPTER II.

THE MILK-PRODUCING BREEDS OF CATTLE.

It is usual with writers on cattle to classify them by the length or shortness of their horns; and, as a matter of natural history, it may be the most correct mode of dividing or classifying the different tribes of animals which prevail in the various districts of Great Britain and Ireland. But for practical purposes, it is by no means either advantageous or convenient. There are certain breeds which have peculiar qualities, and, as the size of horn has no connection whatever with those qualities, it is by far the most desirable course to classify them according to their properties rather than by any arbitrary mark of distinction which may be altogether unindicative of their peculiar characteristics.

There is in this country a great variety of pasturage—from the very rich to the very poor, and from the extremely warm to the exposed and stormy—and in every gradation of this range a class of cattle is bred and propagated. The great object for which cattle are kept by the farmer is either to grow beef for the market, or to produce milk, to be sold, or converted into butter or cheese, for the supply of the great towns. Hence the one farmer selects the fat-producing, and the other the milk-producing, class of animals. Nature has provided that different races of animals, and different individuals of these races, are, more than others, adapted to the secretion of one or the other of these necessary products; nor has all the skill of man been able to detect a breed equally calculated, in any very great degree, for the production of both. The objects of the two secretions are essentially different; and the tendencies and qualities necessary for both are sparingly concentrated in the same animal. For while the former is a reservoir of the carbonaceous matter of the food, reserved for subsequent use in the alimentary system, the latter is the secretion of a substance necessary to support the young progeny, until it is able to sustain itself, and procure from the green pastures the food provided by the Omniscient Giver of all. Hence, to produce milk is, more or less, the natural quality of all kinds of cattle. Some will give large quantities, but thin and poor in quality; some smaller quantities, and rich in oily matter; while others will afford a small portion, but abundant in solid matter. The first class would be selected by the milk-man, near the populous city; the second by the dairy-man whose product was intended to be butter; and the third by the maker of cheese.

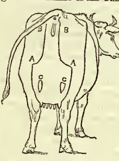
The milk-producing breeds are more widely diffused than any other, because they are capable of being kept to advantage on that description of herbage which is inadequate to sustain the fat-secreting breeds. The bulk of the grass-lands on the clay soils of the country, on the sides of the uplands, and even on the poorer sands, is quite adequate to supply the means of making butter or cheese; but it will very ill repay the person who attempts to feed cattle on herbage so inferior; while the rich alluvial feeding-pastures, which generally skirt the rivers of the kingdom, are far more profitably employed in raising summer beef, than in the production of milk, of cheese, or of butter. The length of horn, in a practical sense, has no connexion with the classifying of cattle. Some races of long-horns, of short-horns, of middle-horns, or even of polled animals, are to be placed amongst the one class we have alluded to, and some amongst the other. Hence we prefer arranging the breeds most celebrated for the quantity or quality of their milk under the first head, and reserve the second division for the races which possess a special aptitude for fattening.

The question here very naturally arises, how far is it possible to detect, by external conformation, the capabilities of the individual animal for the secretion of milk? There are instances in every breed, where it is evident that nature has been more bountiful, or more niggardly, in bestowing the qualities calculated to produce the secretion for which the race may be celebrated; and there are, doubtless, marks, well-known to the dairy-man, which seldom fail to indicate the status of the animal in the range of qualities peculiar to his race. On the continent of Europe this knowledge has been professed to be carried to a very minute extent. François Guénon, a Frenchman, professed to have found, by close observation, a mode of deciding authoritatively, not only the quantity and quality of milk which would be given by any particular cow, but also the period for which she would retain her milk after calving. This he proposed to do by external appearances alone; and these of a somewhat arbitrary kind.

The Agricultural Society of Bourdeaux appointed a committee, in 1837, to test Guénon's capabilities, and they reported that, although the mode by which he ascertained these qualities was a secret, he had succeeded in satisfying them of the reality of the system he pursued. They subjected his process to an experimental test, which was very effectual. Separate cows were brought from strange dairies, and he wrote down the characteristics and qualities of each. These were compared with the separate statements given by the owners of the animals; and, in cases of more than sixty head, he succeeded in stating all their peculiarities exactly, excepting a very slight difference in appraising the quantity of milk—a difference the committee attributed solely to the quality of food given to the animal.

The Central Society of Agriculture of Cantal also reported upon his system with equal favour. They thus describe the process of investigation pursued:—"He accompanied the members of your committee to the farm of Veyrac, belonging to the president of the society. He examined with scrupulous attention the fine dairy of cows of this domain, which is composed of one hundred milch cows of the best kind in the country................ M. Guénon gave upon each of them separately precise indications as to the quantity of milk each of them give per diem, and the length of time they would hold their milk after being again in calf. We must avow to you, gentlemen, that they have almost in every instance agreed with the declarations of the owners of the cows."

It is not within the compass of this little work to give anything like a description of the mode he adopted, which has since been made known, though we believe not published in this country; but the foundation of his system is the classification of all kinds of cattle into eight classes or families: each family being divided into three sections, according to size only, and each section again subdivided into eight orders. The distinguishing marks by which he divides these are—1, the *Gravure*, commencing at the udder, and extending at the bearing; 2, the *Epis*, a soft brush of hair upon the animal; and 3, *Contrepoil*, or hair growing the contrary way. The peculiarities of these marks constitute the distinction between the families and orders. Thus, if the gravure be large, the reservoir of milk will be large, and the produce abundant. If it be formed of fine hair, if the skin be yellowish, and if a kind of bran powder comes off the skin, of that colour, signs of a good milker are indicated. The rationale of it is, that this gravure is but a continuation of, and corresponds with, the lactiferous vessels under the belly of the animal. These "epis," he states, correspond with the reservoir of milk, and are tufts of hair growing the wrong way on the right or left of the bearing. The largest epis indicates the most rapid loss of milk. The contrepoil, or hair growing the wrong way on the gravure, amidst that which grows upwards, shows a default in the production of milk, even if the gravure be large. We give a fac-simile of his Class I. "FLANDRINES."



AA. BB. The Gravure.
CC. The Epis.

So far the above is a general description of a system which he invests with minutiæ of no ordinary kind; and it is so precise and prolix that it would require some score of plates to show the variations of family, class, and order.

Without definitively pronouncing that there is no merit in Guénon's observations, it seems perfectly clear that many of his indications are of a character generally indicative of quality, but are carried far beyond their legitimate objects; for while a wide capacity of upper udder—a fine hair—a yellow scurf, are somewhat too indefinite to classify very precisely, they are just the points which may indicate a fineness of quality, and a large lactiferous capacity, that may add to the physiological signs by which a milking-cow is judged by the practical grazier.

Beauty of form is the last qualification in a good dairy cow. Symmetry to a breeder is no criterion of milking qualities, more than a very "pointy" short-horn makes a good subject for a painter's cattle piece. Indeed the parallelogram is the beau-ideal of a fattened ox in section, and a cylinder is that of his superfices; thus exhibiting the essence of *roundness;* whereas the very converse is the perfection of the milker—that is, *flatness.* The following are the best settled marks or characteristics of a milking cow. Head small and fine, eye bright and full, but with a quiet and placid expression; neck thin and deep, which gives it an appearance of hollowness; shoulder and breast narrow, but projecting; ribs flat; rumps broad, and tapering down to the knee joint, owing to the thighs being thin; tail small; udder large and round, with four teats, well formed, tapering to the end, and at a moderate distance from each other; thin in its skin, and with plenty of skin above; its fore-teats round and full, and with a large subcutaneous or milk-vein, as it is commonly but erroneously called. There must, above all, be kindliness of touch, indicative at once of good breeding and of quiet disposition. These, with a calm and serene temper, are indications of milk-producing animals, which, where health is present, are almost infallible criterions.

We shall now proceed to describe some of the most prominent features of the best kinds of cattle for milk-producing; and a few only of the many varieties of cattle in the island will be selected. To review the peculiarities of each of the prevailing breeds in each county would fill a volume; we must therefore content ourselves with a selection of the best. We place first

THE AYRSHIRE BREED.

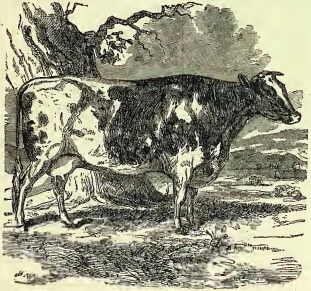
These are a valuable breed of middle-horned cattle, exceeding, perhaps, any breed of dairy cows in the kingdom. Small in size, their want of symmetry is not so obvious. They afford milk of a very rich quality, and rather oily. They fatten more rapidly than many other races of cattle; for when the butyraceous deposit is stopped by drying, the system soon accustoms itself to secrete fat, which they soon acquire on a pasture inferior to that required by more tender animals.

There is no description of the race equal to that described by Mr. Aiton, whose work on *Dairy Husbandry* so far exceeds any other, that it is generally quoted even to the present day:—"Head small, but rather long and narrow at the muzzle; the eye small, but smart and lively; the horns small, clear, crooked, and, at their roots, placed at a considerable distance from each other; neck long and slender, tapering towards the head, with no loose skin below; shoulders thin; fore-quarters light; hind-quarters large; back straight, broad behind; the joints rather loose and open; carcase deep, and pelvis capacious, and wide over the hips, with round fleshy buttocks; tail long and small; legs small and short, with firm joints; udder capacious, broad, and square, stretching forward, and neither fleshy, low hung, nor loose; the milk veins large and prominent; teats short, all pointing outwards, and at a considerable distance from each other; skin thin and soft; hair soft and woolly. The head, bones, horns, and all parts of least value, small; and the general figure compact and well proportioned."

Such was Mr. Aiton's description; but, with the exception of thickness of buttock, it will be inappropriate to the present Ayrshire cow.

There are two other characteristics which seem so thoroughly belonging to this breed, that they ought not to be passed over. The one is the black muzzle, and the other is the yellow red, which seems to be the natural colour of the race, arranged not in considerable quantities, but in blots or patches. Thus the animals generally present a sort of checked aspect of golden-yellow, red, and white.

The produce of these cows in milk and butter is very great. An Ayrshire cow will give from 600 to 800 gallons of milk in the course of the year; and five gallons per day is by no means uncommon for three months after calving. This, however, falls short of Colonel Fullarton's estimate, in his *Agriculture of Ayrshire*, where he states that, though the Ayrshire cow will not, when fat, weigh more than twenty to forty English stones, "it is not uncommon for these small cows to give from twenty-four to thirty-four English quarts of milk daily during the summer months, while some of them will give as much as forty quarts."



THE AYRSHIRE COW.

This milk is also very productive of butter. Three gallons and a half of such milk will yield a pound and a half of butter; so that as much as 260 lbs. of butter will be yielded by an Ayrshire cow; and it is no uncommon thing to have eight or nine pounds of butter produced from one of these cows for some weeks after calving. About twenty-six gallons of milk will afford fourteen pounds of cheese; or a good cow will yield some thirty-five stone of cheese per annum, which, taken at 10s. per stone, will produce in this article alone as much as £18 per annum.

It has been questioned whether the rich districts of Ayrshire ought to be occupied with this breed of cattle. They are said to be more suitable for cottiers than for graziers, and that the latter ought to direct their attention to feeding the short-horn, while the former should combine dairy-farming only with the occupation of a labourer. To this it may be answered, that while the cold rains, so prevalent in that county, would render it problematical whether the short-horns would be sufficiently hardy, it is also certain that the second-rate pasturage of much of the grass land is more suitable for the dairy cow, possessing the hardiness of the Ayrshire breed, than calculated for fattening the less enduring short-horn. Nor have the improvements in the breed of Ayrshire cattle increased their milking qualities. To breed what would sell in England, and what would feed as steers, has been too much an object; and as the larger breed of Ayrshire cattle are more profitable for the market, and the smaller for the dairy, the former have been more encouraged. The preceding engraving represents a much improved Ayrshire cow, of rather a large size.

There is another peculiarity of the Ayrshire cows which is deserving of notice. They hold to their milk to a very late period. They are cultivated and nurtured to give milk. Nature would teach an animal to give a supply so long as its calf needed that nutritious assistance; but so far have the milking qualities of the Ayrshire cow been brought out, that in some instances it has been known to yield milk all the year round, and even retain it to an advanced age.

THE ALDERNEY BREED.

General consent has given the name of "Alderney" to the Channel Island breed of cattle, which have been so long celebrated for the *quantity* of milk they give in proportion to their size; but, above all, for the extraordinary richness of its *quality*. There is every probability, however, that these cattle were originally a Norman breed, imported and improved in Jersey, and then sent to Alderney; and thus a common stock, famous far beyond the milk-cows of Normandy, has been produced, which is considered so valuable in this country as to produce prices varying from £20 to £30. There is a firm of gentlemen in Yorkshire, whose business it is to purchase these extraordinary cattle. They make regular journeys to the Island to select them, and have periodical sales by auction. In the neighbourhood of London, also, several parties import them for sale by auction and at their private establishments; but the best breeds are not easily procured.

We are indebted to Colonel le Couteur for almost all we know of this breed of cattle. In many respects it resembles the Ayrshire cow. Indeed, so close is the resemblance, that Mr. Quayle (in his *Agricultural Survey of Jersey*, communicated to the Board of Agriculture,) states that "the Ayrshire was a cross between the short-horned breed and the Alderney."

As the qualities of the Alderney breed of cattle are exclusively milk-producing, we expect to find anything but beauty of form. Indeed, until within the last twenty years, a more misshapen animal it is difficult to conceive. The Channel Islanders, possessing cattle superior to others for the richness of their milk, and well sustained by the inferior herbage the island produced, were satisfied with their ungainly form. The breed might be thus described: Large cheeks, thin hollow neck, hollow back, thin hams, flat sides, long between hip and ribs, crooked legs, high shoulders, drooping rump, and tapering chest.

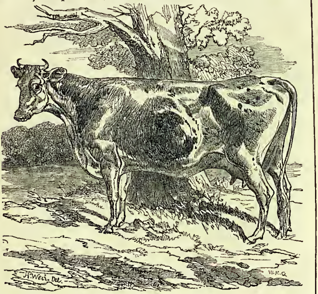
The specimens of improved forms of cattle, which began to receive the attention of agricultural societies, tended to call attention to the improvement of the Alderney breed. Hence a society sprang up, under the presidency of General Thornton, who, by selecting the best specimens, drew up a scale consisting of nine articles, and to each of these articles attached a number of points, thirty of which were assumed to be perfection in a cow. These are much more definite, and we think more practical, than those of M. Guénon; and we cannot resist giving them, because they indicate the proper criterion of the improved Alderney cow. They are for cows and heifers :—

	Points.
I. Breed, on both parents' sides, reputed for producing rich and *yellow* butter	4
II. Head small, fine, and tapering; eye full and lively; *muzzle fine, and encircled with white;* horns polished, a little crumpled, tipped with black; ears small, of an orange-colour within	8
Carry over	12

	Brought over	12
III.	Back straight, from the withers to the setting on of the tail; chest deep, and nearly of a line with the belly	4
IV.	Hide thin, movable, but not too loose, well covered with fine soft hair, of good colour	2
V.	Barrel hooped and deep, well-ribbed home (having but little space between the ribs and hips); tail fine, hanging two inches below the hock	4
VI.	Fore-legs straight and fine; thighs full and long, close together when viewed from behind; hind legs short, and bones rather fine; hoop small; hind legs not to cross in walking	2
VII.	Udder full, well up behind; teats large, and squarely placed, being wide apart; milk veins large and swelling	4
VIII.	Growth	1
IX.	General appearance	2
	Perfection for cows and heifers	31

We cannot resist giving an engraving of the perfect Alderney, because it may be taken as a fair specimen not only of the most perfect animal which the above scale aims at indicating, but will also mark the great improvement in the style of this breed of cattle; and will, so far, incidentally mark the improved character of the *other* breeds of cattle in the country. Moreover, we would ask, is it more wonderful that the wild cattle of Chillingham Park, changed and improved by the agency of food, climate, crossing, in-and-in breeding, and the skill of man, should be the type of the original breed of cattle in this country, than it is to see his handiwork, as displayed in the improved form of the Alderney cattle during a period of twenty years?

The produce of these small animals, both in milk and butter, is very great, and may be taken, in fair specimens, at twenty quarts of milk daily, and ten pounds of butter in the week, during the months of April, May, June, July, and August. Instances are recorded of cows giving twenty-six quarts of milk in the twenty-four hours, and yielding as much as fourteen pounds of butter per week! From this it is clear that the cream is of very rich quality; the milk itself being superior to much of the town-made cream, and the cream almost resembling cream-cheese. It is considered too rich by many persons for making cheese; but instances are recorded of successful cheese-making from this milk. M. Le Feuvre, of La Hogue, succeeded in making cheese of a very superior quality from this fine milk; equal, indeed, to double-Gloucester. Fourteen quarts of milk being capable of producing a pound of butter, the same quantity would give a pound and a-half of cheese; and the whey or drainings of twenty pounds of this cheese would produce four pounds of butter, somewhat inferior for toast, but quite adequate for the making of pastry. Compared with the milk of any other cows celebrated for dairy purposes, that of the Alderney is very superior. An experiment was made, in the months of May, June, July, and August, between eight Alderney and eight Kerry cows. In the first month, the Alderneys gave 25 per cent. of cream agaist 10 per cent. of the Kerrys; in June, 20 per cent. against 10; in July, 23 per cent. against 10; and in August, 16 per cent. against 13; giving an average of about one hundred per cent. more cream than the Kerrys—a race of cows rather celebrated for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THE ALDERNEY BREED.

dairy qualities. But this was not all. Three pints of cream from the Alderneys produced 1 lb. 8½ oz. of butter; from the Kerrys, 1 lb. 4½ oz. This, too, was taken in the month of August, when it will be seen the milk of the Alderneys was falling off. The experiment was made by Mr. White, on the farm of the Hon. R. Clive, of Oakley Park, and deserves every credit, as it seems to have been carefully made.

THE YORKSHIRE COW.

Having given instances of milk-producing cows from the middle-horn and crumpled-horn breeds, we now select one of the short-horned class; not indeed, the improved Durham short-horn, but a large capacious animal possessing several of its qualities, and giving a large quantity of milk, with as much aptitude to fatten as is consistent with the production of milk. Hence it is selected by the dairymen of large towns, and especially of London, for the supply of milk for a given period. When fatted on distillers' refuse, and other waste matters which a town supplies, it thus affords double remuneration to the dairyman.

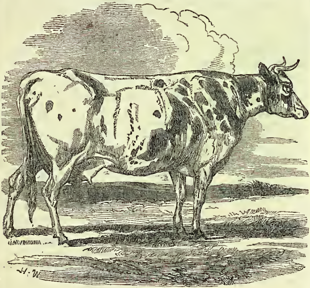
The Yorkshire cow is of much larger size than either of those we have been considering, and, when fat, will weigh from sixty to eighty stone. Her head is fine, and somewhat small; there is a serene placidity of eye, which shows a mild and gentle disposition, tending alike to produce fat and milk. The horns are small and white, the muzzle without black spots; the breast deep and prominent, but that and the shoulders thin; the neck somewhat narrow, but full below the shoulders, and without any loose skin; the barrel somewhat round; the belly capacious; milk-vein large; back perfectly straight; rump wide, and flat as a table; tail small, and set on so that there is almost a straight line from the tail to the head. The prevailing colour is roan, or red and white; and sometimes white, with the tips of the ears red. The thighs are thin; but the legs are straight and rather short. The udder is very large and muscular, projecting forwards, well filled up behind, and so broad as to give the cow the appearance of a waddle in her walking. Indeed her qualities are not inappropriately described in some doggerel lines often quoted; and two of the verses we shall venture to give, as most aptly descriptive of the Yorkshire cow:—

"She's broad in her ribs, and long in her rump,
A straight and flat back without ever a hump;
She's wide in her hips, and calm in her eyes,
She's fine in her shoulders, and thin in her thighs.

> "She's light in her neck, and small in her tail,
> She's wide in her breast, and good at the pail;
> She's fine in her bone, and silky of skin;
> She's a grazier's without, and a butcher's within."

The engraving given below represents a Yorkshire cow, and is a fair specimen of a short-horn Yorkshire cow, without pretensions to pedigree—a sample of the kind purchased by the dairymen of London.

The quantity of milk given by these cows by far exceeds that of any others, though less perhaps than that of some others *in proportion to size.* The writer has had instances where as much as thirty quarts per day, in summer, have been given. The distended udder has so swollen before calving—"wedged," is the local and technical term—that she was obliged to be milked several days before she calved; and, after calving, had to be milked three times a-day, for fear of the consequences of an over-distended udder. Moreover, she gave a



THE YORKSHIRE COW.

large quantity of butter as well as milk; and soon after calving she has given fifteen pounds per week.

When the Yorkshire cow is purchased for the London dairies, usually after her third calf, her milk changes its character. She is rich in her native pastures in butyraceous matter; but the object in London, Liverpool, and the large towns, is rather to increase the *quantity*, than to improve the *quality* of the milk; hence the cattle are fed with brewers' grains, boiled linseed, &c., &c., and the out-door exercise is restricted, so that their powers of secretion all converge to the production of milk alone. Mr. Laycock, in his London dairy, which is supplied by Yorkshire cows, retains no cow which does not yield two gallons of milk per day, and the average of his dairy is as much as nine quarts daily.

Considering all these things, and taking into account the carcass value of the cow after she has yielded her copious supplies of milk, it is not too much to affirm that there is no breed of the vaccine race so profitable as the Yorkshire cow.

Having thus minutely considered the three leading breeds of dairy cattle—the cheese-producing Ayrshire, the butter-secreting Alderney, and the milk-giving Yorkshire—it only remains to glance at the breeds or crosses which prevail in the principal dairy districts of the country; for as types of this class of cattle, the three breeds above-named may be taken as perfect.

THE GLOUCESTERSHIRE BREED.

This is more a mixture of the several breeds of the country (long-horn and middle-horn) than any distinctive race—the old Gloucester cow being nearly extinct. The various crosses to which dairy cattle have been subjected have obliterated all traces of the original race; but early crosses with the long-horned breed have somewhat prevailed. The Devons have also been used as a cross to impart a more kindly disposition to fatten, and the Durham short-horns have also occasionally been tried; but the poverty of keep, too common amongst the Gloucestershire dairymen, has had a great tendency to deteriorate the breed. The same fate has in general attended attempts to cross with the Herefordshire cattle.

Of the successful crosses adopted in this country, one by Mr. Drinkwater S. Hayward may be mentioned. He first crosses an ordinary Gloucester bull with an Alderney cow; and having thus obtained richness in the milk, he adopts a Durham bull to increase the tendency to flesh and to size, and to improve the form generally.

This gives a stock one half Durham, while the other half is constituted of one part Gloucester and one half Alderney. He keeps one hundred cows, and selects, for keeping, the calves produced by his best milkers. The average yield of an ordinary Gloucester cow may be reckoned at five hundred gallons of milk, yielding about twenty-four stone of single Gloucester cheese; the remainder of the milk being used in the family, and for fatting the calves, or for pig feeding, which is largely practised in all dairy districts.

THE LEICESTERSHIRE BREED.

The old breed of this county has had a more successful struggle for existence than the native breed of Gloucestershire. It was here that Bakewell exerted his talents to improve the long-horned breed of cattle. Though he succeeded in removing the coarseness from these animals, and increased their tendency to fatten, it appears he did not attain the object of either establishing or improving their dairy qualities. Hence his breed is but little prized, and scarcely patronized by the Leicestershire dairymen, who prefer the coarser and larger animals, that give large quantities of good milk, to those which have less milk-giving capabilities, but are more suitable for the grazier.

The yield of cheese, rather than that of milk, is the object of the dairymen of Leicestershire. A good cow will give about four hundred pounds of cheese, and produce as many gallons of milk, in the year, allowing for the seven weeks when she is supposed to be dry.

In some districts the cows are kept for six, or seven, and even more years, especially when they are good cheese producers; for it is of more consequence to the farmer to have a cow which, for six years, gives him an annual supply of the stock-in-trade of his farm—his cheese—than to get a few pounds more or less when she is sold. Indeed a smaller difference really takes place than may be at first imagined. The rich Leicestershire grass enables the farmer, on a large scale at least, to sell off his cattle fat, which would have been disposed of for the dairy. Hence, as old cows of any kind are not expected to be very valuable graziers, he does not expect her to do wonders; and if he succeeds in getting her moderately fat, he is satisfied with taking a smaller price per stone for her beef than is received for a primer animal. She would only make "cow beef"—merely fitted for ship beef, or for "provisioning the navy."

THE KERRY BREED.

Crossing the Irish Channel there is a hardy small-sized cow celebrated as a cottier's dairy cow—the neat pet-like cow of Kerry. Her placid countenance, patient, meek deportment, fine head and legs, her small tail, flat shoulders, breast, and quarters, and her skinny udder and large milk-vein, all bespeak the characteristics of the milker. Hence she is a treasure to the cottage-farmer. She is so hardy, that she will live where other cattle will starve. She will yield milk at the expense of her own muscles—nay, will yield it abundantly when they appear all sunken; and will give it also of quality so rich, that she is a perfect machine for converting the hardest and coarsest cattle-food into rich and nutritious milk and butter.

THE CHESHIRE BREED.

Like that of Gloucestershire, this breed is becoming rapidly extinct. The old breed of the county was, like that of most dairy districts, a long-horned variety; but the vicinity of the large town dairy system, introduced into the country by the growth of large towns, has brought here, as elsewhere, the short-horn cow of Yorkshire into competition with the native breed. The extra *quantity* of milk they produce has been more regarded than its *quality*: consequently, the character of the Cheshire cheese has been deteriorated in the markets.

Another reason why the short-horned cattle have made more way in this county than in others, is the care taken to prevent exposure to the weather, and also to the manuring the worn-out grass-land with bone-dust. This animal manure so improves it as to give great advantage to an animal requiring a good quality as well as a fair quantity of food, both of which the short-horn requires.

Mr. Palin, in his Prize Essay on the Farming of Cheshire, appropriately observes: "Doubts, I believe, exist in the minds of some intelligent farmers, whether any improvement has been effected in the milking properties of dairy cows, as regards quality, by the introduction of the improved short-horns amongst them. That the latter breed is much disposed to fatten, is admitted; but this class of cattle does not stand very high in public estimation as milkers. It may, therefore, be reasonably supposed that there are good grounds for thinking that it is very possible to introduce too much of the improved short-horn blood into the dairy stocks, and that great caution should be taken in crossing. However that may be, I am of opinion that an improvement may be effected by the introduction of the blood *to a certain extent*; care being always taken to select male animals intended to be reared from the best milkers."

THE DORSETSHIRE BREED.

In this, as in most dairy districts, milk is more an object than either form or fat; and hence, a somewhat coarse, ill-shapen class of cattle prevails. They are of the long-horn breed, large and coarse, principally of a red colour, with flat chests and buttocks. Attempts have been made to cross this also with the Devon, Hereford, and Ayrshire breeds, but without success. The only advance the dairymen have been enabled to make in this country has been to introduce one Alderney to a dairy for every ten or twelve of the native breed. This is found to have a very beneficial tendency in increasing the quantity of cream, and improving the quality of the butter.

It is not necessary to expatiate on all the crosses or breeds, more or less distinct, which prevail in the dairy districts of this country; nor does it come within the range of this treatise to examine the qualities of the foreign breeds. We shall, however, conclude with a short description of one more animal, which may be classed, after all, as a sort of milking cow. We mean the

SCOTTISH KYLOE BREED.

The cattle of this breed are so called from the fact of their having crossed the *Kyles*, or ferries, with which the Highlands of Scotland abound. These were, as Parkinson observes, the models which Bakewell had in view for the improvement of the Leicestershire breed; and had he known more of them in the early stages, they might have had their share in the crossings for improving the Dishley herd. They may be considered the perfection of the largest middle-horned race of cattle, having their long *rumps*, *loins*, and *crops*, with but a moderate amount of offal. As length in these parts is thoroughly consistent with thinness of chest, buttocks, and neck, it is not improbable that improvements in this direction would enable the dairyman to have a rich milk-secreting animal, with a considerable aptitude to fatten and form flesh on the most valuable parts, when she came into the hands of the grazier.

The hardihood of the Kyloe cow makes up for the wildness of her nature. She can resist a cold blast under which a delicate lowland dairy-cow would perish. She will consume the small and stunted grasses which appear among the heath, the mosses, and even sometimes the sea-weed itself. In winter, when the severity of the weather prevents the cattle from obtaining their food from the morass and the moor, they are occasionally assisted by a few oatmeal balls. Thus it need not excite surprise if the aggregate amount of butter and cheese raised by these miserable supplies is but small. Thirty-two pounds of butter per annum may be stated as the produce of a cow in the Hebrides, and from ninety to one hundred pounds of cheese, which is made after their celebrated fashion, by flavouring it with aromatic herbs added to the rennet.

It is difficult to see that the qualities of dairy cattle are specific and distinct, and that any attempt to transmute them, so as to exchange the *flatness* of conformation of the milker for the *rotundity* of the grazing animal, is done at the expence of her dairying qualifications. Nor is it difficult to see that those breeds possessing the conformations calculated for milk secretion are precisely those which, from their endurance and hardness, are most suitable for second-rate grass land, where the dairying processes are principally carried on. When the soil will not feed the fat-producing animal, Providence has wisely provided the milker, in order that no spot of ground should be without the produce fitted for his creature man.

CHAPTER III.

FAT-PRODUCING BREEDS OF CATTLE.

WHATEVER theoretical objections may be raised against over-fed cattle, and great as may be the attempts to disparage the "mountains of fat," as highly-fed cattle are sometimes designated, there is no doubt of the practical fact, that the best butcher cannot sell anything but the best fatted beef. Of whatever age, size, or shape a half-fatted ox may be, he is never selected by judges as fit for human food. Hence a well-fatted animal always commands a better price per pound than one imperfectly fed, and the parts selected as the primest beef are precisely those where there is the largest deposits of fat. The rump, the crop, and the sirloin (the very favourite cuts, which always command from twenty to twenty-five per cent. more than any other part of the ox), are just those parts on which the largest quantities of fat are found. Thus, instead of the taste and fashion of the age being against the excessive fattening of animals, it is, practically, exactly the reverse. Where there is the most fat there is the best lean; where there is the greatest amount of muscle, without its share of fat, that part is accounted inferior, and used for a different purpose. In fact, so far from fat being a disease, it is a condition of muscle necessary to its ultility as food—a source of luxury to the rich, and of comfort to the poor.

Fattening is a secretive power possessed by grazing animals, which enables them to reserve a store of the superfluous food they take, for seasons of cold or of scarcity. The fat collects round the angular bones of the animal, and gives the appearance of rotundity. Hence the tendency to secrete fat is indicated by a *roundness* of form, as opposed to the *flatness* of a milk-secreting animal. The fat lubricates the joints, gives elasticity to the skin and muscles, and obviates the effects of pressure. But, above all, it is a store of heat-producing aliment, laid up for seasons of scarcity and want.

The food of animals, for the most part, may be said to consist of a saccharine, an oleaginous, and an albuminous principle. To the first belong all the starchy, saccharine, and gummy parts of the plants, which undergo changes in the digestive organs similar to fermentation before they can be assimilated in the system; through them also is animal heat sustained. In sluggish animals the oily parts of plants are deposited and laid up as fat; and, when vigour and strength fail, it is taken up, and supplies the place of the consumed saccharine matter. The albuminous or gelatinous principle of plants is mainly useful in forcing muscle; while the ashes of plants, the unconsumable parts, are chiefly for the supply of bone, hair, and horn, as well as of muscle and blood. They also supply the waste which is continually going on. Now these are the several qualities which are essentially characteristic of a disposition to fatten.

There have not hitherto been any book-rules laid down, as in the case of M. Guénon's indications of milking cows;* but the above are marks so definite and well understood, that they are comprehended and acted upon by every grazier, though perhaps not easy to describe. A land-valuer will tell with reasonable accuracy the productive quality of a given soil to which he may have been a stranger; but it would be difficult for him to describe upon paper all the indications of barrenness or fertility which his practised eye alone could detect. It is by experience and skilful acumen that the grazier acquires his knowledge, and not by theoretical rules. Observation, judgment, powerful perceptive faculties, and minute discrimination are essential to his success.

The first indications he relies on is the *touch*. It is the absolute criterion of *quality*, which is supposed to be the keystone of perfection in all vaccine *animals*, whether for the pail or the butcher. The skin is so intimately connected with the internal organs, that it is questionable whether even the schools of medicine, in the diagnosis of disease, might not avail themselves of the knowledge of this important point. The physiological tendencies of cattle are of the last and most vital importance. The skin must neither be thick, nor hard, nor adhere firmly to the muscles. If it is so, the animal is a hard grazer, a difficult and obstinate feeder. No skilful man will purchase her. She must go to a novice, and even to him at a price so low as to tempt him to be a purchaser. On the other hand, the skin must not be thin, like paper, nor flaccid, loose in the hand, nor flabby. This is the opposite extreme, which is indicative of delicateness, and possibly of inaptitude to retain the fat. It must be *elastic* and velvety, soft and pliable, presenting to the touch a gentle resistance, but so delicate as to give pleasure to the sensitive hand; a skin, in short, which seems at first to give an indentation from the pressure of the fingers, but which again rises to its place by a gentle elasticity. The hair is of nearly as much importance as the skin. A hard skin will have straight and "stickle" hair; it will not have a curl, but be thinly and lankly distributed equally over the surface. A proper grazing animal will have a *mossy* coat, not absolutely curled, but having a disposition to a graceful turn, or a semifold, which presents a waving inequality; yet as different from a close and straightly laid coat, as it is from one standing off the animal at right angles, which is a strong symptom of disease. It will also, in a thriving animal, be licked here and there with its tongue.

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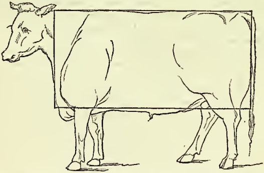
* See p. 18. It is a remarkable fact that M. Guénon (when on a recent visit to Mr. Hudson, of Castleacre, one of our best English farmers) selected those out of his Devon cattle which proved to be the best milkers.

So much for the feeding qualities of the animal, and the conformations indicative of this kindly disposition. The next consideration is the formation of the animal, so far as it is favourable to the growth of fat. There must be size where large weights are required. Christmas beef, for instance, is expected to be *large* as well as *fat*. The symbol of festivity should be capacious as well as prime in quality. But it is so much a matter of choice and circumstances with the grazier, that profit alone will be his guide. The axiom, however, as a general rule will be, that the better the grazing soil the larger the animal, and the poorer the soil the smaller the animal. Small animals are unquestionably much more easily fed; and they are well known by experienced men to be those best adapted to the second-rate feeding pastures of this country. Beyond this there must be *breadth* of carcass. This is indicative of fattening, perhaps, above all other qualifications. If rumps are favourite joints, and produce the best price, it is best to have the animal which will grow the longest, the broadest, and the best rump. The same may be said of crop, and of sirloin; but *breadth* is essential to the consumption of that quantity of food which is necessary to the development of a large amount of fat. Thus a deep wide chest, favourable for the respiratory and circulating functions, enables the animal to consume a large amount of food to burn up the sugary and deposit the fatty matter, as then useless, but afterwards to be prized. A full round crop will be of the same physiological utility, while a broad and open framework at the hips will afford scope for the action of the liver and kidneys.

There are other points also of much importance: the head must be small and fine. Not, perhaps, that it is of any special use in the fattening of the animal to be so constructed, but it is indicative of the bones being small and the legs short. For constitutional powers, the beast should have his ribs extended well towards the thigh-bones or hips, so as to leave as little unprotected space as possible. There must be no angular or abrupt points; all must be round, and broad, and parallel. Any depression in the lean animal will show a deficient deposit of flesh and fat, when sold to the butcher, and thus deteriorate its value; and hence the animal must be round and full. But either fancy, or accident, or skill (we will not pretend to say which) has associated *symmetry* with quality and conformation, as a point of



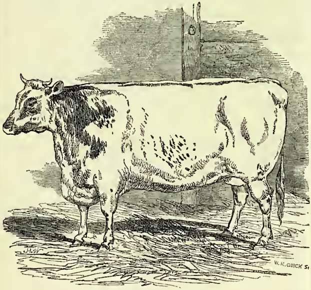
great importance in animals calculated for fattening; and there is no doubt that, to a certain extent, this is so. The beast must be a system of mathematical lines. To the advocate of symmetry, the setting on of a tail will be a condemning fault. The ridge of the back like a straight line, with the outline of the belly exactly parallel, when viewed from the side, and a depth and squareness when viewed from behind, like a geometrical cube, may be said to be the indications of excellence in a fat ox. We give an outline of the points of excellence in one of these animals. Now, these qualities are inherent in some breeds. There may be cases and instances in all the improved breeds, and in most there may be failures. By far the first in the list for feeding excellence are

THE SHORTHORN, OR DURHAM BREED.

In speaking of this breed, we mean that which owes its almost European notoriety to the vast improvements effected by Charles Colling. The origin of the breed, as well as the elements from which he worked out his magical effects, is involved in great obscurity. These animals are supposed by some to be traced to Holderness; and, according to others, to have been imported from Holstein. From continental Europe they certainly appear to have sprung; and, being successively improved by a variety of breeders, they have ended in that distinct race of animals, extraordinary beyond all others for their astonishing propensities to feed. Others, again, refer their origin to a native race of cattle called the Teeswater, because they have from time immemorial inhabited the valley which the Tees has formed by its washings-down of the mountain limestone rocks in which it has its origin. These, it is said, being crossed by the Holderness importations, gradually became a new race.

The late Mr. Bates traces the short-horns to a breed in the possession of the Aslabys of Studley, and the Rev. H. Berry to an improvment in the East Riding of Yorkshire, by the importation of a breed from Holland by Sir W. St. Quintin, of Scampston. Of these obscure ages of the short-horns, however, it is hardly necessary to say more than this—that a breed from time immemorial inhabited the valley of the Tees, which, trained and educated to feed, for a vast succession of generations, on its fertile deposits, acquired the habit of speedy fat-forming. In these valleys, where *hay alone* will feed the largest ox, the production of fat would be so far an object, that breeders would always select the best and easiest feeding animals; and thus the character of the district, through a number of centuries, might easily lay the groundwork of that improvement which the Millbanks, the Greys, the Booths, the Coates, and above all the Collings, have effected.

We will give the latest description of the qualities of the modern short-horn from the most recent authority, Mr. Dickson. After referring to the general symmetry of the frame and its delicate colour, either deep-red, cream-coloured, white, or delicate roan—the latter, by the by, the most fashionable and indeed prevailing colour—he speaks of it as possessing "the mellowest touch, supported on small clean limbs, showing, like those of the greyhound and the race horse, the union of strength with fineness, and ornamented with a small, lengthy, tapering head, neatly set on a broad, firm, deep neck, furnished with a small muzzle, wide nostrils, prominent mildly-beaming eyes; thin, large, veiny ears, set near the crown of the head, and protected in front with semicircularly-bent white or brownish-coloured short, smooth, pointed horns; all these several parts combine to form a symmetrical harmony which has never been surpassed in beauty and sweetness by any other species of the domesticated ox."



MR. WILSON'S SHORT-HORNED HEIFER.

Bearing in mind what has been stated to be the perfection of a fat animal, the same authority, speaking of the short-horn, says: "We have a straight level back from behind the horns to the top of the tail, full buttocks, and a projecting brisket; we have, in short, *the rectangular form;* we have also the level line across the hook-bones (hip), and the level top of the shoulder across the ox, and perpendicular lines down the hind and fore legs on both sides; these constituting *the square form* when the ox is viewed before and behind, and we have straight parallel lines from the sides of the shoulders along the outmost parts of the ribs and the sides of the hind quarters; and we have these lines connected at their ends by others of shorter and equal length across the end of the rump and the top of the shoulder; thus constituting the rectangular form of the ox when viewed from above down the back."

It will be far from our purpose to show either the immense amount of fat which has at one time or another accumulated on the backs of these wonderful animals, or the speed with which this has been done. Neither would it tend much to elucidate the principles of breeding or grazing, by describing at length the prices which short-horns have commanded, and still continue to command.

The Durham Ox, a son of Charles Colling's Favourite, weighed 187 stone 2lb. The Yorkshire Ox, bred by Mr. Dunhill, of Newton, near Doncaster, weighed, when killed, 264 stones 13lb. These are weights of 14lb. to the stone, and show the strange capabilities to accumulate fat and flesh possessed by this extraordinary race of animals. Though there is not, perhaps, another instance on record of any bull selling for as much money as Charles Colling's Comet, which sold for 1,000 guineas, and whose herd, forty-seven in number, sold for £7,115; yet £500, £600, and as much as £800, are still given for a first-rate short-horn bull.

In improving his breed, Mr. Colling had recourse to a single cross with the polled Galloway. He then bred back to the short-horn, and the result was a stock called the ALLOY, so named at first in contempt, but afterwards as a distinction. His cross was between a short-horned bull called Bolingbroke and a beautiful red Galloway cow, which produced a bull calf. This in due time was the sire of a bull calf, by the pure short-horn cow Johanna. The bull calf again became the sire of the cow Lady, by a pure short-horn cow, which became the dam of the noted bull Favourite. Thus was founded this celebrated stock. At the sale the cow Lady, fourteen years old, was sold for 206 guineas, and her daughter, Countess, nine years old, for 400 guineas.

Nor is it in their rapid fattening alone that this race of cattle excels. They are beyond all question the most remarkable for early maturity. Fat deposits are generally the result of a mature state of the animal. There are few animals which develop them to any degree, until they are fully formed. The short-horn is an exception. They commence the fat-forming process as calves. This seems to increase with their growth, and at a year old they have all the semblance of cows. This is strikingly manifested by the drawing of the heifer belonging to Mr. Wilson, of Brawith, taken at only twelve months old. (See page 36.)

The feeders of shorthorns, instead of keeping them to three, four, or five years of age, fatten and sell them off at from two to two-and-a-half years. They can thus turn off one-half more, at least, of beef from their farms or their stalls than could possibly be produced with

THE SHORT-HORNED COW.

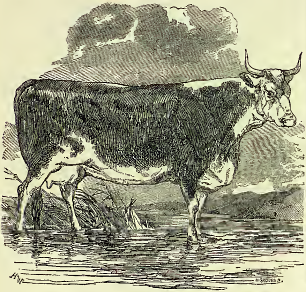
any other breed. Thus they have quick returns and large amounts of beef for the food-consumer. We will not deny that the short-horned requires good keep and shelter, and care. She needs nursing and nourishing diet when young: but she repays all; for she is a cow when another is a calf. The ox is fat when the other is growing. She will purchase a horse before a Devon will buy a saddle. Hence, the short-horn stands the very first on the list of fat-producing breeds of cattle. We give, on the preceding page, a specimen of a matured short-horn cow.

THE HEREFORD BREED.

This is a middle-horn breed of cattle, to which a good deal of pains has lately been devoted. The success of short-horn breeders—of the Booths, the Bates, the Wileys, the Hoppers, and a score more of short-horned patrons—have caused a healthy emulation. The difference between the Hereford cattle now exhibited and those shown some ten or twelve years ago, shows not only that these breeders have judgment and skill, but that the breed has fattening capabilities.

The old Hereford was a deep-brown animal, sometimes with an ochrey cast, free from white, like the Devons; but an improved breed now possesses the county, in which the invariable fashion is a dark red, with a white face, white belly, and not unfrequently a white back. The skin is thicker and less mellow than that of the short-horn; neither has the hair the mossy softness or graceful curl of the latter. The eye is full and lively; the chest deep and broad; the loins also broad, and the hips well expanded; a level, broad rump, a round barrel, and full crop; full and deep flank, well ribbed home; small bones; clean and perpendicular thighs; belly almost parallel with back; head small. Indeed, colour and symmetry are perhaps the predominant qualifications which secure the high favour of the breeder.

From the preceding description, it will be seen that the Hereford, though possessing many essentials in form, is destitute of those qualities which tend to produce early maturity and speedy fattening. He accumulates his flesh, soft and mottled, on the best parts; he has full sirloins, rumps, and crop; but he shows his beef all outside; and he requires much more *time* to develop his qualities than the short-horn. In milking qualities the Hereford cow is even behind the short-horn; and she must, in general, be three-and-a-half to four years old before she can be fatted with any marked success. The breed requires a rich pasture; and their average weight, when fat, does not exceed fifty-five to sixty-five stones. Herefordshire being more a breeding than a feeding county, the cattle are reared there, and sold off at three years old, in order to graze in the counties of Leicester, Northampton, and the rich grass districts. But with all the good qualities, it must be admitted that they require from ten to twelve months more to feed than the more favoured short-horn. We give a sketch of a first-rate specimen.



THE HEREFORD COW.

Much controversy has gone on lately as to the merits of the two breeds—the short-horn and the Hereford. But it must be admitted that, while the short-horn is penetrating into the heart of Scotland and the south of England, and into the counties of Gloucester and Norfolk, the Hereford is scarcely keeping its ground. It is making no inroads into any one important new grazing district; and, unless the gigantic efforts now made to amend the characteristics of the breed effect something more than heretofore, they will continue to dwindle away.

THE HIGHLAND SCOT.

Next to the Hereford, in the ranks of fattening animals, we place this long-horned breed of cattle; and well they deserve it—for they will fatten where both the short-horn, aye, and the Hereford too, would perish. This West Highland breed is rather wild in its nature, and will not bear the least confinement, tying, or control. It is eminently gregarious, and if kept alone will generally fret and pine. The peculiarity of the breed is, that it is a small animal, generally deep jet-black, or light dun, seldom having any white spots on any part of the body. Its horns are long, and turned upwards and outwards. The coat is soft, long, and absolutely curled, so as to form a sort of fleece. Another peculiarity is, that these animals form their beef almost

[THE WEST HIGHLAND BULL.]

entirely on the back, which is therefore straight, while the body is round; and they accumulate fat rapidly under circumstances in which another animal would literally starve.

Like the Jerusalem artichoke amongst plants, this animal can derive, from a soil so barren as to be sterile for others, as much as will enable him to feed—though to *grow* is out of the question; *that* process is performed on his native hills. If indulged, however, he will pay for loss of time by the rapidity of his fattening, and the excellence of his beef. These animals will weigh, with amazing little care, from 48 to 50 stone, and some have been said to reach as far as 70. The exceptions to this rule, however, are very important in special cases. The Duke of Northumberland, having a very promising Argyleshire "stot" (bullocks as they are called more generally in England), kept him as long as he could, to see what he would weigh. He was five and a-half years old, and weighed, exclusive of offal, 100 stones 4 pounds. Though, perhaps, one of the heaviest of the breed ever slaughtered, he was neither the fattest nor the most inactive, but seemed in that state which exhibits all the activity that he possessed on his native hills.

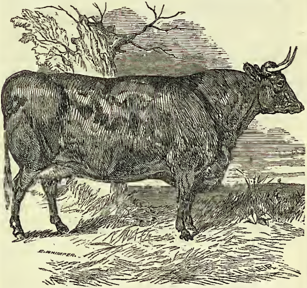
To convey an idea of his keeping, and of the hardihood of his race, it is only necessary to give an account of his food. In the first winter he was turned out to a poor pasture, with a little bad hay. In the summer he had again a poor land pasture. The next winter he had again a poor pasture, but a few turnips. During the following summer he had a fair pasture, and the same pasture in winter, with a more liberal allowance of turnips. The third summer he was tolerably well grazed. In the fourth winter he had as many turnips as he could eat in the sheltered straw fold; and in the summer in which he was fatted he had all the indulgence of a feeding animal, viz., cut clover, hay, mangel-wurzel, turnips, bean-meal, and a little oilcake; the latter of which he always disliked. Mr. Quarl says, "fat was distributed in an uncommonly equable manner, of a colour resembling the finest grass butter, and as firm as wax; the lyer (muscle) was in ample proportion, bright in colour, of fine texture, and beautifully marbled by admixture of his excellent fat."

On the preceding page is an engraving, from an original drawing, of a winner at Smithfield, of this class.

THE DEVON BREED.

If this had been a treatise on the drawing of cattle, we should have placed this middle-horned description of animals first in our list, instead of almost the last. They are physiologically well formed animals, and are a very old and distinct breed. They are docile and tractable, patient and gentle, as well as hardy, notwithstanding their warm and humid climate; but they are not first-rate milkers, nor, if early fat is the grazier's object, are they very extraordinary feeders. Still they will feed, and grow to a considerable size. They produce a class of beef, at some periods of their growth, of fair quality.

The red colour—all red, and nothing but red—is a *sine quâ non* in a Devonshire ox; he has a moderately straight top, a fine serene



[THE DEVON COW.]

countenance, a small head, and a somewhat thin skin, covered with curly hair. The rump is narrower than that of the short-horns, and the crop lighter and flatter; but the brisket is large and full, the legs fine, the shoulder slanting, and the neck long and thin. He is what would be denominated, in the short-horn districts, a "shelly" animal. He partakes too much of the Ayrshire or Alderney qualities to be a good grazer; and the cow has too much of the Hereford to be a good milker. He is a beast of draught; and for this he is unequalled.

A short-horn breeder, in his prejudices, thus describes the cattle at a fair in Devonshire: "With the exception of one animal, I did not see a level carcass; but a want of beef in the roasting parts, low and poor loins, coarse shoulders, bad twist (thighs), and a general want of indications of inside proof." Of the beef, when killed, he says, "The meat was actually running about the stall, being nothing more than a mixture of flabby masses, deficient of fineness of texture and quality."

Mr. Parkinson, in his invaluable and practical Treatise on Live Stock, mentions that a thin hide in the Devons is not quite a recommendation. He gives the weight of some specimens of six years old cattle, drawn, doubtless, by Mr. Brodie, which weighed some 57 stone 2 lbs.; but the cows much less. He says of them, "On the whole, they must be allowed to be good cattle for their soils, and particularly where oxen are worked at the plough. When slaughtered, they are a sort of beef that suits the consumption of many customers."

Amongst the most successful breeders of Devonshire cattle may be mentioned Mr. Turner, of Barton, near Exeter. We give on the preceding page an engraving of one of his cattle, which is quite a model of the best of the Devons, and not by any means common. This gentleman is doing much in the way of cultivating early maturity in the Devon cattle. The specimens he has recently exhibited do credit to his skill and judgment, and tend to rescue the breed from some imputations which it is to be feared the greatest part of them deserve. It will be some time, however, before they maintain the high position given them by Mr. Youatt, who was evidently a better veterinary practitioner than a judge of the capabilities of the breeds of cattle. To suppose that they are the original breed of the island is simply absurd.

THE ABERDEENSHIRE BREED.

We shall conclude our remarks on the fat-producing class of oxen by shortly describing a hornless or polled race of animals—the Aberdeenshire "Doddies," as they are called. Being bad milkers, they are generally used for grazing, and very much fatted in their native country. They are also purchased for feeding by the graziers of Leicestershire and Norfolk. Their colour is generally black, but occasionally red; the head fine; the breast deep; the back not quite straight, being a little depressed at the loin, and somewhat narrow; the eye full and clear; the touch generally good, and the hair thick and curly. The tendency of the flesh, like all the hardy Scottish cattle, is to form on the back; but they will weigh from 70 to 80 stones, and will even reach as far as 100 stones when five or six years of age.

The specimens we have selected will fully make out the correctness of the principles we laid down in judging of fat-forming cattle. Qualities are so co-existent with conformation, that this, as a general rule, may be received as an axiom. As it is clear that dairy and butcher qualities can only be combined to a very limited extent, and that both qualities can never be high in the same breed, it becomes the agriculturist to make his selection, according to the object he has in view.

CHAPTER IV.

THE PRINCIPLES OF CATTLE-BREEDING.

One of the most wonderful instances of man's supremacy over creation is the influence he is able to exercise in directing vital processes. Here his power is perfectly talismanic. Within certain limits, he has the power of asserting his dominion so far as to make stern nature obey, and do his bidding. If he wants size or hardihood, activity or gentleness, milk or fat—nay, even wool or mutton or beef—he can so arrange the elements with which Divine Providence hath blessed him, as to bend and mould and adapt them to his will, until he has produced the kind and class of animal he requires. This power arises more from individual skill than from science. Whatever physiological principles are involved, they are best discovered by the facts known to the breeder, and teach him little in the management of his business. The perseverance and skill, the powers of observation and discrimination possessed by some breeders, have doubtless been the cause of their success, and led to England's becoming pre-eminent for food-producing animals; for in no other part of the known world can it be said that there is anything like such specimens to be found, either for producing flesh, milk, butter, or cheese.

To watch physiological tendencies, and avail themselves of all discoveries, was the practice of breeders long anterior to scientific research. Emulating the skill of the wily progenitor of the Jewish race, and intelligently perceiving what was required, Collins and Bakewell attempted and attained the art of producing cattle and sheep "ring-straked, spotted, and speckled," at pleasure. Seeing also the necessity of economizing food, they set about cultivating those animals which came to maturity early, and thus produced a much larger quantity of animal food from the same amount of vegetation. Knowing that fat was an element of favour in a northern clime, they endeavoured to obtain animals with a tendency to secrete it in large quantities. In order to do this, they observed the qualities indicative of these tendencies; and, knowing that it is true in physiology, as in mathematics, that like produces like, they selected and bred from animals possessing them, until they stamped their qualities permanently and invariably on their produce. With these they managed to combine their usual concomitants, symmetry and beauty. Hence the origin of our flocks of Leicester sheep, and our herds of short-horn cattle, so intimately interwoven, even in their mortality, with the proud national boast of the "Roast Beef of Old England."

There are in all animals, high as well as low, those exceptional instances where an individual far outstrips his congeners in some particular quality. Now, if another possessing the same qualities should be paired with this individual, there is certainly no guarantee that the produce will exactly inherit both. A knowledge of this fact has disheartened many a breeder. For instance, he wants milk: he selects for his female breeding animal the best milk-cow in his dairy, and carries her to a bull which is also the son of a dairy-cow of standing and character. He expects the produce to be a milker; but he is disappointed: and in disgust he retires, and leaves to chance what he thinks he cannot obtain by skill and effort. He is in error. The principles of breeding are perfect: but he has not had the patience to wait for the fruit. One of his selections was an accidental product. She was not the successor of a favoured ancestry. She so far outstripped her race as to be possessed of qualities in which they were deficient; but her produce "kinded back:" they resembled more the true breed of which she was an exception; and thus the breeder was disappointed in his expectations, and gave up on the first skirmish, instead of bearing the brunt of the battle. He should have gone on selecting the most famous for milk within his reach; and he would by-and-by have acquired, as a tendency of his breed, the accidental qualities which would have become the *rule*, instead of the *exception*.

Hence the improvement of a breed of stock is not the work of a day or a year, but the business of a life-time. If a breeder were to start *de novo* to engraft some peculiar tendency on a herd of cattle or a flock of sheep, it might be that his sons would reap the benefit of his skill and efforts, if they were rightly directed. There would be no certainty of the full qualities being established in two or three generations only.

There are not only limits, therefore, to the mathematical axiom that like produces like, modified by vital powers with which the breeder has to deal, but we think there is a principle deeper still, one little noticed by writers on breeding stock, yet one which all our great breeders knew and practised—viz., that some one animal has much more power of transmitting his qualities than others. We know at this moment a couple of gentlemen, who show the best short-horn cows and heifers, who may be said to have the best female animals perhaps in the kingdom, but who hardly ever get a prize for one of their bulls; and their best animals were all got by a bull who never was qualified to merit a single distinction. He had no great symmetry himself, but was coarse and ungainly; yet he had so much vital force, that he impressed symmetrical beauty on all his progeny, be his partners what they might. He was thus the sire of a complete herd of winners. The remarkable results of the Collings in cattle-breeding were really due either to the skill they had in seeking this transmissive power, or to the accident of obtaining by chance an animal who possessed it—their bull Hubback.

Little as is known of this bull—for he was purchased of a cottager, who grazed him in the lanes—it is quite clear that, to have any merit as a short-horn, there must be more or less of the Hubback blood. Now the fact was that, when that animal's mother was taken to good keep, she ceased to breed, owing to becoming so fat. He soon did the same; but he was the sire of all the Collings' best cattle, and his grandson, Foljambe, was acknowledged to be the animal which most improved the herd—nay, the very sire of Comet. The bull Favourite was from the union of a brother and sister, whose common parent was this same Foljambe.

Thus, in breeding animals the counterpart of each other, though it may not in the first generation prove all that could be wished, yet it gives the tendency in the breed to progress in that direction; and the careful and persevering selection of animals with the same tendency, through several generations, must have these results.

The difficulties now in the way of breeders are by no means those which met Bakewell, Colling, or Culley. They had to make a groundwork from raw materials, so to speak; and they had to carry them single-handed through every stage of their manufacture. At this time, it is different. In the present breeds of the country, there is sufficient variety on which to found any of the required qualities of animals; and the difficulties of selection are comparatively light. It requires, however, as much skill as ever to keep any one variety of animals foremost in the race, when there are so many excellent sorts to breed from. The original improvers, therefore, had perhaps less difficulty than the present race in maintaining their position. It is true they had to work without rules or experience; but they had the whole field before them, and they had fewer competitors. The race they improved was such, that every step they took was palpable and definite. There were fewer combinations of blood necessary, and consequently less risk of a failure. Now, the main effort is directed to overcome a defect. Suppose it is the very common one of a flat crop—a hollow behind the shoulder-blade: that sire must be selected, whose peculiar physical conformation, in harmony in other respects with the herd, has this point in perfection. On the calves there may be little impression; but if they are again paired with another animal having a similar conformation, there will be more impression produced, and on a greater proportion of the herd. Still, they will be variable; and it will require effort after effort, and a long process of attentive selection and rejection—*weeding*, as it is called—before it becomes a uniform characteristic of the herd, and the change be permanently sustained.

In speaking of the modes of improving a breed, the question arises, How far is this to be done by the adoption of a male, or a change in the female animals? The universal consent, we may say, of breeders of all classes, seems to award the value to the male. The greatest care is taken in selecting a stallion; while the worst and most useless mare is sent to him. The flock-master will give from twenty to fifty pounds for the use of a ram, who would grudge to give five for a ewe; but it is, it must be confessed, somewhat different in cattle. The dairyman is very careful in selecting his cows. They are watched, as heifers, for the development of their good qualities, and are preserved either for their succession to a maternal race of milkers, or because they are promising in themselves; but the bull to which they are sent is too often a matter of convenience rather than selection. They know he is a bull; and that is enough. The too-usual mode is, to try the heifer by her first calf. If she promises well as a milker, she is kept for a cow; if not, she is consigned as a "drape" to the grazier, for the butcher. Reasoning from analogy, the mother would be naturally considered as more influencing the animal than the sire. The influence of the mother is long and continuous. Her blood flows through its veins, it partakes of her habits and sympathies; but still the vital force of the male animal is pre-eminent. Much as the mother may influence the constitution, the sire possesses a far greater sway over the conformation, the qualities, and the appearance. If, therefore, the object of the breeder is to perpetuate and impress the good qualities, and to remove the defects of his breed, he will be careful in the selection of both the sire and the dam of his breeding animals. A single failure—a single year's neglect—may stamp qualities on his race which it may take years to eradicate; for even to keep a breeding stock in a high state of excellence, is by no means so easy a task as may be imagined.

This brings us to the much agitated question of breeding *in-and-in*; in other words, of breeding animals solely from the same stock, all possessing more or less affinity for each other, and all originating in one or two varieties of animals. The controversy has ranged from Bakewell downwards. He bred entirely from his own stock. Opponents to the system say his animals became small and feeble in constitution, and they failed. But he only adopted one of the first axioms of breeding—he selected *the best he could find*. He saw and knew none like his own, and he took them because he could not find their equals. He attained high perfection by the system. He obtained a breed of good animals. They were attaining good qualities. He bred from them with each other, to give that breed permanency and uniformity, and indelibility to his flock and to his herd. Suppose he did get them small and delicate? His object was to produce animals less coarse, less gross, less hard than the original stock; and he succeeded, although possibly he carried his predilections too far.

Analogies are attempted to be made between the human subject and the brute. It is said that in the former the most serious physical and mental disorders arise from too near consanguinity. A family intermarries afflicted with mania, or consumption, or scrofula. Intermarriage where these diseases exist will increase the virulence of the tendency, until the family become weak and feeble, or may become extinct. They do so not because they breed in-and-in, but because they disregard the first principles of increase. They render permanent the defects of the stock by alliances of similar tendencies. Mr. Bates' maxim was, "Breed in-and-in from a bad stock, and you commit ruin and devastation." They must always be changing to keep moderately in caste; *but if a good stock be selected you may breed in-and-in as much as you please.* If deficiency of mental power be a consequence of in-and-in breeding, surely it will be an advantage in *feeding animals;* for the sensuous with them ought entirely to swallow up the intellectual, to make them profitable.

The objectors to consanguineous breeding, and its deteriorating and enfeebling character, seem to forget that in the case of the wild cattle at Chillingham Park, to which allusion was made in the introduction, no cross has been made for an immemorial number of centuries; and thus, unchanged and unchangeable, they remain, without deterioration, without feebleness—a standing objection to the indiscriminate condemnation of the system of breeding from the same stock.

The answer, that these animals do not show any improved points, is an argument in favour of this system of breeding. The fact that they never had them, and possibly never will have the chance, so long as the breed is kept pure and unalloyed, is quite decisive in its favour. Like all other wild animals, a natural law prevents the feeble male from exercising any unfavourable tendency. The herd have a king, and during the rutting season fierce and almost deadly battles take place amongst the bulls for the favour of the females. The hardiest, strongest, and most enduring male is the victor, and he becomes the parent of the future herd. This may and is likely to continue for some years, because, when once admitted a victor, a great change must take place before the contest will be renewed. No sooner, however, does the male animal become feeble than another season renews the strife. The once proud patriarch is vanquished, and the youthful victor, full of vigour and virility, is in turn the paramour of the herd.

Now if we admit the influence of the male animal to be the greatest, we have here the most perfect adaptation for the weeding of the herd, and the best constitutioned bull is the parent of the whole race for two or three years of production. It is not wonderful, then, that they have no points, no superiority, no distinctiveness of breeding. There is no selection of adaptation, of symmetry—even of semblance; but there is strength of constitution in the male—the quality, above all others, best calculated for securing strength of constitution, hardness,' and size in the offspring. Assuming that this tyrant strength in the patriarch of the herd will continue for three successive years—a feat extremely probable—there is a degree of consanguinity which few breeders will attempt. It may be said of Mr. Bates' herd, now that he is dead, that their quality was unsurpassed, and that the heifers were frequently bulled by their own grandfather, or the cow by her grandson; and this was no more irregular than the wild habits of the whole herd at Chillingham, where the daughter, if not the granddaughter, must breed with the grandsire or the sire.

Mr. Bates and Mr. Bakewell were not alone; for Mr. Colling bred his animals in very close affinity; and Mr. Mason, of Chilton, second only to Mr. Colling, was an in-and-in breeder. But supposing the stocks of the Bakewells and the Collings became smaller and too fine in bone? Let it be remembered they were trying to reduce the size and improve the quality; and if they carried it too far, it is no more forcible as an argument against the principle than any other want of judgment in the details is to any other system. No one will accuse Mr. Bates, however, after a jubilee of in-and-in breeding of the closest kind, of having either a small or feeble herd.

The very opposite to consanguineous breeding is the system of *crossing*. When two distinct kinds of animals are made to breed with each other, a distinct variety is produced, called a hybrid or mule. Now there is not externally a greater difference between a Shetland pony and a donkey, than there is between a Durham short-horn and an Irish long-horn. But zoologically there is a more marked and distinct dissimilarity. Now, when the zoological difference is beyond a given range, nature interposes, and will permit no further admixture. Mules are almost invariably unproductive. But with ill-assorted crosses of different breeds of cattle she operates another way. The union of a male and female of different qualities, will sometimes produce a happy combination of the qualities of the two, and considerable uniformity in the produce; but the union of these products again amougst each other, instead of inducing a greater uniformity, ends in a crowd of mongrels, differing from each other as much as from their grandsires, and possessing the conformations and qualities of neither. For instance, a cross was attempted between the Herefords and the Devons—the fat-forming Hereford and the active-working Devon. The cross was a failure. The power and activity of the Devons were lost, and their working qualities impaired; yet they did not fatten like the Herefords. A cross of the same with the Alderney improved indeed the dairy qualities of the breed, but lost the muscle so necessary for work and the capacity for feeding; so that this cross was also a failure. Again, a cross has been attempted between the Hereford and the Kyloe breeds. This, it might be supposed, would improve the back of the Hereford, give hardiness, and keep up the aptitude to fatten; but no, the cross had the fattening qualities of neither, and the quietness of the Hereford was lost in the wild habits of the Kyloe, although the bull was a Hereford, and the cows were of the Highland breed.

Coming to closer approximations of character, a cross between the dairy Ayrshire with a short-horn in all his grazing aptitude does not succeed, simply because in the Ayrshire itself, particularly the improved breed, a good struggle goes on between fat and milk, which ends in diminishing the latter in quantity, and sending the fat through the udder in the shape of butter. A short-horn cross decides the contest; it gives up the Ayrshire to the grazier, and takes her from the dairyman to consign her to the butcher.

The most successful cross ever made, perhaps, even by the great Colling himself, was between the Galloway cattle and the improved short-horn. But he adopted the only mode of crossing which, in the circumstances, seems to be feasible. One of his short-horn bulls was put to a well-selected Galloway cow; and the produce of this union was a bull. He proceeded no further with this cross, but carried back the blood to his short-horn herd. To this bull he put a short-horn heifer, with a large succession of Hubback blood. The result of this union was another bull, the sire, amongst others, of his cow Lady, which at the sale sold for 206 guineas. It is by no means improbable that the straight back, the rotundity of form, and the width of hips were due in some measure to this Galloway cross, as well as that shortness of leg, the most obvious defect of the Teeswater cattle, which the Collings were so anxious to improve.

So much for the union of a Galloway and a short-horn, for the purpose ostensibly of improving the short-horn breed. This cross, whatever may be said of its inroad into the purity of the blood, is certainly a most successful and most judicious instance; for where a large and powerful-framed animal is covered with a short-horn bull, quality and aptitude to fatten are given. To go further is not judicious. To attempt a cross with a milk-producing cow is unnatural and absurd; but there is no sort of large-framed animal intended for the grazier, which would not be improved by a cross with the short-horn for one generation. With the smaller West Highland cattle, even for grazing, we should have doubts. They lived in a hard, bleak, district, to which a dash of short-horn blood, however small, could hardly ever accommodate itself; but to the larger Scotch breeds a single crossing would be invaluable. This may be strikingly instanced in the case of a cross between a short-horn bull and a large Aberdeenshire cow, to which was awarded the prize by the Highland and Agricultural Society of Scotland, in 1834. The live weight of this cow was 224 stone, of 14 lbs. to the stone; and she weighed when killed 173 stone 3 pounds.

To attempt a greater proportion of short-horn blood is to run a risk of losing the hardihood of the northern tribes of cattle, without giving much more aptitude to fatten. It is certainly true that the maturity of the breeds might be accelerated. We might see the Galloway a cow at two years old; but even this must arrest the hardihood of the breed, impair its endurance of a northern blast, and waste in winter the advantage gained in summer.

It is questionable, however, where crossing is to stop. Some very grave facts have been arranged and classified to show that when a pure-bred animal has once been impregnated by one of another breed, such impregnated animal is thereby for ever afterwards a cross, and may be expected to produce cross-bred and no more pure-bred young. But the notion is capable of being carried further still—that a female animal will always produce young resembling in character the animal by which she was first impregnated, whether of a cross breed or of the same breed as herself. Now, if this approaches to correctness, and if a single cross will stamp its character for ever upon the animal which is the subject of it, there arises the necessity for the utmost caution in selecting a male animal, especially in the first impregnation of the female.

The hypothesis of Dr. Harvey, of Aberdeen, and Professor M'Gillivray is, that the intimate connection, at least in bovine animals, between the fœtus and its mother—consisting of an absolute circulation of the blood of the fœtus through the veins of the mother, and *vice versa*—so impregnates the mother with the vital functions of the sire, as to render her for ever afterwards incapable of transmitting her own unimpaired qualities to her progeny; thus making her partake of the character of her first young, whatever be the defects or peculiarities of the sire.

The case of the Earl of Morton's chestnut mare, which was put to a quagga, or wild ass, is well known. The produce gave the most unmistakable signs of the quagga in its head, its ears, its stripes on its shoulders, &c. Afterwards, in three successive seasons, the mare was put to a black Arabian horse, and in as many years did the foal strictly resemble the quagga.

In 1821, as related in the *Transactions of the Royal Society*, Sir Gore Ousely had a thorough-bred mare covered by a zebra. The produce was a striped animal, resembling of course its sire; the mare was afterwards covered by a thorough-bred horse; but a striped animal was the result; the year afterwards she was put to another horse, with the same result. Six black-faced horned Scottish ewes were selected by Mr. H. Shaw, of Leochel, and were served in 1844, some with a Southdown, and others with a Leicester ram, the one a white-faced, the other a dun-faced, but both hornless rams. Of course the lambs were crosses. In the following year but one, they were put to a horned ram of their own black-faced breed, but all the lambs were hornless, and their faces of a brownish character. Again, they were put to a very superior ram of their own breed. On this occasion the crosses of some were less distinct, but two of the lambs were polled or hornless; one was dun-faced, with very small horns, and the other three were white-faced, with very small round horns only. The ewes were considered so spoiled and impure, as to be put off from the flock; and he never obtained from them another lamb.

Dr. Hugh Smith's case with his favourite setter bitch is a remarkable fact in point. Following him one day in the season, she was warded by an ugly cur, and the setter was so degraded, that he shot the cur. Dido, however, mourned the loss of her nose in the partridge season; she was put to a superior setter; but, lo, her produce were the colour and picture of the cur; and in her many subsequent litters no other kind of animal could be procured from her but a cur-looking puppy.

Take another instance from a pig. David Giles had a black-and-white sow, which became pregnant by a wild boar, of a dun colour. Of course the breed was mixed, or crossed, showing symptoms of the qualities of both its parents. But the same sow was afterwards put to two different boars belonging to Mr. Western, and in both instances the dun colour prevailed in the breed, though perfectly unusual before.

But the case of an Aberdeenshire heifer, mentioned by the late Professor M'Gillivray, is more in point in a treatise on cattle. She was put to a short-horn bull, being hornless herself, and had her first cross calf to that animal. She was afterwards put to a pure-bred bull of her own kind; but she again had a cross calf, a horned animal, though both its parents were hornless.

Another instance is mentioned, by the same authority, of another Aberdeenshire cow which had been served by a first cross between the Aberdeenshire and shorthorn, and to this animal she had a cross-bred calf. In order to have a pure-bred calf from her, she was put to a pure Aberdeenshire bull; but the produce was a cross calf, both in colour and appearance.

It is extremely difficult to resist evidence of this kind. So many facts tending the same way almost lead irresistibly to the conclusion that there must be a sort of impregnation of the whole system by the first animal in the cases stated, and that this influence has continued through the remainder of the animal's life, weakened perhaps through time, but still leaving abundant traces of the effects.

But, what is more remarkable still, there are instances of resemblance where there could have been no impregnation whatever. It did not appear, even in the case of Dr. Smith's Dido, that the intercourse with the cur, if any, had been fruitful; but the following facts will show the impossibility of any connection whatever. Mr. Blaine had a pug bitch which made a companion of a small white spaniel, from which she was separated on account of her heat, and she was warded by a dog of her own breed. She brought puppies, one of which was slender and spaniel-like, and perfectly white; and in two subsequent litters she always had one white puppy, though it might be less slender than the first. It is true, that by possibility she might at some period have had unobserved intercourse with the spaniel, in which case the principle would be the same as in the previous cases.

The next case, however, is one where this was impossible. A mare and a gelding had long been companions in the team, in the pasture, and in the stable. He was black with white legs and face, and had a singular rectangular form of hind legs. After some two years' association like this, the mare was covered by a bay stallion, with black legs, like herself. The foal exactly resembled the gelding in colour and shape, especially of his hind legs. Here connexion was, of course, impossible.

We shall give one instance more, tending to show that the effect is in some cases produced through the imagination of the mother. Mr. Boswell relates what he considered a well-authenticated instance, of a hornless cow coming in season when one of his neighbour's horned black-and-white oxen broke over the fence, and accompanied the cow home to the bull; both the sire and dam were black and hornless, nor had the farmer any horned or spotted beast on his farm. The produce of the cow was black and white; and in due time its horns grew, resembling those of the ox. If the same neighbour had not also a black-and-white horned bull, the fact is very important!

Little as these facts prove in themselves, they raise a doubt as to whether the imagination of the mother may not, in some indescribable way or other, operate upon the offspring; and in something like proof of this is the wily and politic conduct of the patriarch Jacob, who peeled poplar and hazel staves to induce the strongest sheep to bring forth ring-straked lambs. But whichever principle be right, it is evidently far safer to run no risks with very superior animals, and to cross only with those whose subsequent progeny is of less consequence.

It is sometimes desirable that the farmer should possess the power of *controlling the proportion of the sexes in the animals he breeds.* The wonderful ratio in which they are produced in nature, is one proof of the all-wise provisions of the Almighty in reducing them to certain laws. Many investigations have been made to show how far this is within the control of man. A dairyman is particularly interested in the production of heifer calves, wherewith to increase his dairy stock; a grazier may be equally desirous of producing bullocks for large weights and summer grazing; while a breeder for sale may be anxious to see a goodly proportion of bulls. How far he can control this production, is a question of interest and importance. Hofkener a German, made some calculations as regards the human species; which tended to show that where the father was younger than the mother, the proportion of male births to females was 90·6 per cent.; when of equal age, 90 per cent.; but when the age of the father was greater than the mother (say nine to eighteen years), it was 143 per cent.

Similar in principle was the experience of M. C. C. de Buzareurgnes, who professed to have the power of controlling the sexes in sheep; his principle being the same as the above, viz., that vigour was favourable to female, and the converse to male births. For females, he proposed to select young rams, and place them in a good pasture; for males, three to five shear animals, and place them in an inferior pasture. His experiment was successful. In his female trial there were seventy-six female lambs produced against thirty-five males; and in his male trial there were produced eighty males against fifty-five females. Another trial was made by M. Cournuejouls. One section was put to young male ram lambs, and on a good pasture; the other on a poorer pasture, and with old rams. The result was, that in the first experiment there were fifteen males and twenty-five females, and in the second there were twenty-six males and fourteen females.

Buzareurgnes also showed that in several lots the approximations to male or female births were in the ratio of the ages of the animals on both sides. Thus, of the young ewes put to the young rams, the two-year-old ewes produced fourteen males and twenty-six females and the three-year-old sixteen males and twenty-nine females; while the four-year-old ewes, to the aged rams, and on the poor pasture, produced thirty-three males and fourteen females.

More than this is not known; but there is quite sufficient to indicate that the breeder possesses at least considerable power in controlling the proportion of the sexes, and that the more vigour he has of frame and food the greater will be the proportion of females; and also that the converse will hold equally good. There is enough in the principle to deserve a trial.

CHAPTER V.

DAIRY MANAGEMENT.

Of all kinds of food, milk is one of the most important. Perhaps it is the only one which contains within itself all the elements of food, and in such a form as may be most easily assimilated, and rendered fit for the building up a feeble and delicate structure. This nourishing substance, referring especially to the milk of the cow, contains a variety of proximate and ultimate principles, and every part of it is more or less useful in providing food for mankind.

In one or other of its forms milk is in great reqnest, either as a necessary of life or an article of luxury. The young of our large and populous cities make it a considerable portion of their food. In the shape of cream, the almost universal consumption of tea and coffee has placed it on the tables of the peer and the peasant. In the form of butter it is again present at our tables as a condiment to our bread, and an ingredient in our pastry; while as cheese it again appears, either as part of the diet of the poor or a conclusion to the feast of the rich; not to mention other productions of which the cuisine art has taught mankind the use, in order to pamper the appetite and increase the means of luxurious gratification.

Milk consists chemically of three parts: a watery or aqueous portion, in which its sugar and salts are dissolved, an oily or oleaginous, and a solid and albuminous principle. It thus affords, in turn, a supply of the materials for replacing the waste of the old, or constructing the new animal which partakes of it. The saline and saccharine part forms at once the solids of the system, and the means of sustaining animal heat; the oleaginous furnishes the reservoir of fat to be available in times of adolescence or scarcity; while the albuminous part gives the means of forming sinew and muscle. Thus milk is the *multum in parvo* of mammalian food.

A little before parturition the new sympathies of the system cause the mammiferous glands to swell and enlarge. Adolescent before, they now become ready for energetic action; and no sooner is the young brought forth than the aliment of nature is ready for the sustenance of the being which so short a time before derived its subsistence from an internal source, as it is now preparing to do from an external one.

If the milk taken from the cow be allowed to stand in a shallow dish, a change takes place in its appearance as soon as the cooling process begins. A whitish-yellow substance thicker than the milk separates from it, and swims on the top, forming an adhesive coating over the whole. This is the cream—the richest part of the milk—which leaves the mass below thinner, and of a bluish tinge, well known as skimmed or blue milk. If the upper layer is examined by the microscope, it will be found to consist of a large accumulation of minute globules. These globules are the oily or butyraceous parts of the milk, coated with a thin covering of a more solid substance; and this may be separated from the mass almost entire. Here you have the greatest part of the butter, with some mixtures of other matters. We say the greatest part, for some of the globules of oil, or fatty matter, are still suspended in the milky mass.

If the milk so skimmed be allowed to remain, a further change takes place, more or less rapid, according to the temperature. In hot weather this is very rapid. The albuminous or solid portion of the milk is one which contains an ammoniacal principle, and is liable to run very rapidly to decay. It begins to ferment, and an acid is formed, which immediately determines the solid parts of the milk by uniting with an alkali that keeps the solid part of the milk in a state of solution. Under these circumstances are formed two substances, technically known as curds and whey. The solid portions are distinctly developed, and descend; these are the curds. The watery particles in which they were before dissolved are also determined, and become the whey. If these be now separated, the solid parts—acted upon by the changing agency of the nitrogenous matter, having moisture, heat, and air added—soon show signs of putrefaction. If the whey, or watery part, is then suffered to ferment, and is exposed to sufficient heat and plenty of air, another kind of fermentation will take place, and a slightly alcoholic drink will be produced, which is used for exhilarating or intoxicating purposes by some of the inhabitants of the north-east of Asia.

The separation of the cream from the milk does not take away all the oily or butyraceous matter from the milk, nor does it remove the whole of the solid (caseous) matter from the cream. The envelope of the oleaginous globules is of this same albuminous and changing substance; and in this, by absorbing oxygen from the air, a change also takes place. Curds and whey are formed in the cream itself, but intermixed with a considerable quantity of butter. This butter may be separated in various ways. Heat will send it to the surface by breaking the enveloping globules of casein; but being merely animal oil, it has an insipid taste, and is very different from our table butter. Agitation, with warmth, especially after incipient fermentation has gone on, is the most effectual mode of breaking the globules, by fracturing their enveloping skin; and this is the well-known process of *churning*, of which we shall speak more fully in reviewing the several dairy systems.

In considering the constituent elements of milk, let it be remembered, in the first place, that it contains 87 parts of water, rather more than 4½ parts of sugar, a little more than 3 parts of butter, something beyond one-half part of saline matter, and 4½ parts of cheesy matter (curd or casein). Its weight, from containing so many matters in suspension and solution, is about 3 per cent. greater than that of water. The milk of different animals, however, contains different proportions; and this differs again according to the breed, food, and treatment of the animals. The following exhibits a few of these differences:—

	Cow.	Woman.	Ass.	Ewe.	Mare.
Casein (curd)	4·5	1·5	1·8	4·5	1·6
Butter	3·1	3·6	0·1	4·2	trace.
Sugar	4·8	6·5	6·1	5·0	8.7
Salts	0·6	0·5	0·3	0·7	89·6
Water	87·0	87·9	91·7	85·6	
	100·	100·	100·	100·	100·

Now all dairy operations are aids for developing or arresting the natural changes of milk; and if we give a faint outline here of the principles of these processes, it will very much assist in determining the relative value of the different dairy systems, when we come to details.

The object of the dairyman is sometimes to assist and sometimes to retard the natural stages of decomposition into which milk will run when left to itself. Sometimes it is necessary to defer, sometimes to hasten these stages, and he possesses great power for controlling them. Heat, it will be seen, is necessary to all these stages of action. Hence in winter he can easily arrest, and by artificial application as easily advance, the manipulations of his craft; but in summer it is not so easy to control. He has often to be in his dairy watching his milk under the influence of the sun's rays; and he contrives his dairy so as to keep out the hot rays of the sun as far as possible; or he endeavours, by evaporation or profound shade, to counteract their influence.

To begin with the new milk, it is by no means necessary that the cream should be separated from the milk. If butter be the object, it can be attained without any separation of the cream. There are two modes of breaking the globules of casein; one is by the application of a gradually-increasing gentle heat to the new-milk until the buttery matter floats at the top, which is then taken almost in a boiling state, and churned to butter in a very few minutes. The other is, by at once applying the beaters of the churn to the whole mass of the milk; but as the bulk of liquid is so much greater in the latter case than the former, and skim-milk is of greater value than butter-milk, this is much less frequently resorted to.

Generally the cream is allowed time to ferment. This process aids in breaking down the structure of the enveloping skin, in precipitating the casein of the mass, and thus assisting the maturation and development of the butter. In churning, the heat of the mass rises from five to ten degrees; and in very cold weather it is sometimes necessary to pour in boiling water, in order to obtain the necessary heat. This heat is also indispensable in separating the cream. At a temperature nearly freezing it will rise with difficulty. Perhaps the most regular and healthy temperature is 55°; but so rapidly does it rise at 76° or 77° as to require great skill and attention to prevent the whole mass becoming sour. At the first-named temperature it will be perfectly raised in twenty-four hours; but in the latter state of the temperature it will be complete in ten or twelve hours. As the globules have to rise by specific gravity chiefly, it is desirable that the milk should be disposed in shallow dishes. Glass is clean and beautiful, and porcelain is fashionable; but lead is the old-fashioned and useful medium: it retains the heat of the hot water from the scalding process in winter, and slowly conducts the heat after the cooling from evaporation in summer. The desirable temperature in churning cream is 54° to 55°—a degree of heat preservable only in summer by early churning, and in winter by raising the temperature with boiling-water, and heating the cream at the fire before placing it in the churn, or by adding boiling-water to the mass in the churn.

Besides the matters we have mentioned as being present in milk, and consequently in its products, we must not omit the aroma of the food consumed by the cow. In the case of turnips this is very distinct, and sometimes very disagreeable—causing even pastry to partake of the undesirable flavour. In the spring of the year milk will even have a bitter taste, from the vigour and freshness of the herbs consumed by the cows at that season.

The milk, immediately after calving, is thick and yellow; and in this state it is called "beastings" or "beaslings." This is more abundant in casein or curd, and on this account often forms part of the elements of the curd sold for the purpose of making cheesecakes. Chevalier and Henri gave the composition of these as follows:—

Mucus	2·0	Casein	15·0
Butter	2·6	Water	80·3

The afterings, or strippings (in other words, the last milk taken from the udder of the cow), are by far the most abundant both in cheese and butter; and hence some dairymen make it a practice always to strip their cows themselves, even when the milking has been left to their servants.

The qualities of cream depending on the modes of management as well as the food, vary very much in the different breeds. Thus, in some experiments made, it required twelve quarts from a short-horn cow to produce one pound of butter—something like a day's supply of milk; while nine and a-half quarts of an Ayrshire cow's would give the same quantity; but it is often very variable in the same animal at different periods, and different animals of the same breed will produce very different results both in cream and butter. It is generally necessary to add some colouring matter to the butter. Annatto is used in some places; but the best colouring is the juice of carrots. They may be grated, and the juice strained off. This is both innocuous and effectual.

The churning operation is usually most successful when speedily performed. Though 55° may be the most desirable heat, it sometimes requires more. If the cows of the dairy have all been long calved and the weather is cold and stormy, the operation becomes long and protracted; and when ten and twelve and even fourteen hours have been consumed in churning, not a few churns have been invented to hasten it. Usually, however, if briskly turned, the process will be accomplished in twenty minutes. The first sign of butter is when it is in "shill;" that is, when the caseous matter is separating from the butyraceous. The brisk motion requisite to produce this state of things must be softened, when the small particles of butter begin to adhere to each other; then the butter-milk must be partially let off, and the gathering process, which will continue for ten minutes more, will be complete.

The butter, however, is still in a state far from being fit for use. It contains much of the cheesy matter, and repeated washings in cold water are necessary to secure its removal. If this should not be carefully done, the butter will soon become rancid. The tendency in the caseous matter to decay will induce its speedy decomposition, and also the formation of a variety of substances, especially butyric acid, which has a most disagreeable smell. For the same reason, it is essentially necessary to observe the utmost cleanliness in the dairy. The surgeon who punctures his finger with the dissecting knife, dies of mortification; fresh beef placed in a basket, or in a room where beef has been in a state of decay before, will soon putrefy; and a very little putrefied milk spilled upon the ground, or left in the churn, the pail, or the bowl, will soon so communicate itself to the whole of the milk and cream in the dairy as to spoil churning after churning of the butter it contains.

Professor Trail made several experiments with the different modes of churning. He tried the churning of fresh cream, of fresh milk, of soured milk and cream together, and of the scalded cream. The results of these experiments were not very different from what had been previously taught. They were, first, that the addition of cold water to thick cream in hot weather assisted the churning by facilitating the separation of the butter; then, that cream alone, in whatever state, churned with more facility than when mixed with milk; that butter from fresh cream is the finest, and keeps the best, but the butter-milk from this is somewhat poorer; that the scalding of the cream, after the Devonshire method before alluded to, yields the largest quantity of butter, but requires immediate use, as it soon becomes rancid. His last remark is, that the most economical mode is to allow the cream to be soured, or fermented, as it is sometimes called—though it is a change which is not strictly fermentative—because by this process it yields the largest quantity of butter, and the butter-milk is also the best.

Circumstances, as well as peculiarity in the management, will have great influence on the flavour of the butter. Thus, where calves are fatted for veal, there is often the best butter. The calves are allowed to suck the cows before the milk is taken for the dairy. In this case, the calves get the solid and saccharine part of the milk, and the dairyman all the afterings. Hence he secures a large quantity and a rich quality of butter.

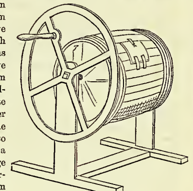
The Bretagne butter, so celebrated in France, owes its peculiar qualities to the mode of its manufacture. It is in such demand that it becomes a manufacturing process; and hence it is made in large quantities—a circumstance always favourable to the quality of butter. The process pursued with this butter is as follows: After churning and washing, the butter is steeped or sprinkled plentifully with new milk, and kneaded into cylindrical cakes, and placed, for a few minutes, in a sort of covered frying-pan, with heated coke both below and above. It is then taken out, and is fit for immediate use. The flavour is peculiar, and the butter particularly rich in flavour.

The real secret of butter-making, it appears to us, is so to arrange the *temperature of the dairy* and the churn, as just to maintain the requisite degree for thoroughly separating the cream; but not so great as to render the whole over-sour. If too cold, the butter will separate badly; the churning will be long and tedious, the butter full of breaks, pale in colour, and brittle in texture; and if, on the contrary, it is too hot, it will be light and oily. It is also essential that the cows should not have calved too long. This will retard the churning process, and have a tendency to make the butter both bitter and unpleasant. Perhaps the best butter will be made from one-half soured cream and the remainder fresh. Enough of the lactic acid will be formed in this portion to facilitate the churning; and enough of caseous matter will be left in the other to prevent its being tasteless.

If butter has to be kept, means must be adopted for its preservation. The souring change soon proceeds; the butyraceous matter changes also into several disagreeably smelling acids. The first mode of preservation is by salting. If it is to be removed far, it may be necessary to pack it well, and exclude the air. Hence, when it is made on a large scale, it is put in firkins, or casks, holding from three to five stones, which are carefully fastened up by the cooper, so as to exclude the air. Salt is well known to have the power of preventing animal matter from falling into the putrefactive state, by means of its peculiar antiseptic power, which prevents the caseous matter of the butter from becoming putrid, and running into decay. But such is the affinity of salt for the moisture of the atmosphere, that the outer portions of the butter soon become subject to the changes which contact with the atmosphere produces. In order, therefore, to keep it for any length of time, it must either be covered with a saturated solution of salt, or with a syrup of sugar, which has the same effect. Otherwise it must be placed in casks which are air-tight, or nearly so, with the top and bottom dredged with salt. In fact, the more the moisture is attracted from the atmosphere, the more closely will the wood of the cask adhere, and *vice versâ*. A very important means of preservation is thus afforded to the dairyman, and to the inhabitants of our large towns; for without this, even with all our facilities of railway transit, it is difficult to conceive how a constant supply could be maintained. The firkins made in summer are opened in winter; and, though not so rich in their contents as the fresh products from the dairy, they form a second-rate class of butter, by no means disagreeable, called kennel butter. When these are opened for use, a very free washing should be given them, to wash out the soluble lactic acid; and the butter should afterwards be well washed, and kneaded in new milk. This gives it much freshness and flavour, which improves and renders it, if well made and packed, much more pleasant than some of the turnip-flavoured fresh butter made in winter.

When once the rancid taste of butter has been acquired, it is never again fit for the table; but it may be so purified as to be by no means useless far pastry purposes. The disagreeable acids are all, to a certain extent, soluble in water. Butter should, therefore, be placed, in clear fresh spring water, over a slow fire, and kept there until the water boils. This will evaporate, wash out, and volatilise the acids. It may then be skimmed off, and put in fresh cold water, again to undergo the boiling process. If after this it be washed thoroughly, it will be found free from any bad effects upon pastry, but very insipid, and unfit for the table.

As to *the form of the churn* there may be a variety of opinions. The ultimate object is to secure that form which will facilitate a rapid, steady, and shaking pressure of the contents; and this is effected either by a flapper, driven through the cream, at a considerable rate, by means of a piston with a perforated base; by a perpendicular motion, raised up or down in a cylindrical or similarly formed vessel; or, what is more common and by no means the worst form of churn, by a cylinder studded with perforated beaters, fastened to its inner surface, revolving round its two axles, and admitting of one handle or two, according to the quantity of the cream. By this means the specific gravity of the cream, and also the force and impetus of the machine, are both brought into action to excite the heat, the pressure, and the agitation necessary to the proper and speedy development of the butter. To this, horse or steam-power may easily be attached, and though there have been many forms of churn in use, we are not certain that any very great improvement on the above has so far been discovered. Plans have been adopted to diminish the labour; but this has often ended in defective operation. The American and the table churns, available for the immediate manufacture of butter every morning for the tables of the rich, are so far a step in advance, and a luxury; but for the large operation of the dairy-farmer, a better application than the churn of his forefathers has not yet been discovered. We give a sketch of a useful kind of modern churn.



[THE BARREL CHURN.]

The principles of *Cheese-making*, in many respects, are those applied to the manufacture of butter; but the object being to a certain extent different, they apply in a different manner. The production of the different kinds of cheese will more appropriately come out in the details of dairy management in the different localities to which we shall have occasion to refer; but they all centre in the artificial development of the cheesy matter (casein) of the milk, whether the milk be new, or that from which the cream has been taken, termed skim milk.

It has been stated that, if left to itself, lactic acid, into which the sugar of milk is changed, soon begins to form, when the air and temperature are favourable to its development. If to this mixture heat is applied, so as to dilate the caseous matter, we should have genuine curd, fit for the manufacture of cheese; but the cheese would be unpalatable, brittle, and hard, and the process too slow for the purposes of commerce. Hence some substance is required to facilitate the change. Lactic acid, naturally or artificially added, will combine with the soda which holds the casein in solution, and form lactate of soda. Here the acid will, with the addition of a little heat, be developed. For this purpose various means may be adopted. The most common is the addition, in some form or other, of the very substance nature herself has provided for the abstraction of the casein, that is the stomach of the calf of some mammalian, generally a ruminating animal. The stomach of the calf curdles the milk in its natural state; and often this curdled milk, the contents of the calf's stomach, the animal having had first a full meal of milk given to it, is withdrawn, and used to produce the change in the milk intended for cheese. The idea seems neither pleasant nor cleanly, nor is it necessary. The stomach itself, if well washed, chopped to pieces, and steeped in water for several months, as many as twelve being in many cases advised, and reduced either to a liquid or powder, or even the skin itself, is equally potent in effecting the coagulation of the milk. The notion that it is the gastric juice of the stomach which curdles the milk, though it will doubtless have that effect, is exploded by Professor Johnston, who satisfactorily shows that the change must result from some acid in the structure of the rennet itself, and not merely from the gastric juice, especially in the cases where it is considered necessary that it should remain for twelve months steeped in water before being fit for use.

The rennet, however, is not the only material used for striking the curd, or hastening the coagulation of the casein. In some cases muriatic acid is used. This acid transfers the alkali of the milk into common salt (muriate of soda). Being diluted with water, it has the same effect as the rennet. Vinegar, tartaric acid, alum, and even occasionally milk, are all used with success; each having in it acid enough to effect the purpose, under favourable circumstances. A considerable part of the fatty matter of the milk will, of course, unite with the curd; but some will remain in the liquid, or whey, as it must now be called. In the case of new milk cheese, the whole of the milk, immediately it is taken from a cow and passed through a fine sieve, is subjected to the action of the rennet. In cases when a full meal of milk will not produce a cheese, the milk of the evening is reserved till the morning, both added together, and the rennet poured upon the mass. As something like 95° is the heat at which coagulation and contraction of the curd is performed with the greatest rapidity, the milk should be raised to about that degree. If more heat than this is given, the cheese will be tough and waxy; if less, there is some difficulty, owing to its softness, in separating the cheesy from the watery matter. In cold weather a small quantity of hot water has to be added to the new milk with the rennet; but if much water is added, or the temperature interfered with more than necessary, it injures the quality of the cheese.

The next process is the cutting of this curd, to separate it from the whey; and this is a manipulation which requires care on the part of the operator. If done rudely or rapidly, it will burst the mass, and press out the butyraceous particles; but it must not be delayed after the curd is formed, or the whey will obtain more than its legitimate share of the butter. The process of draining away the whey, held in loose attraction by the curd, is to cut it in pieces, and lay it on a strainer; then, by the application of slight and equable pressure, to take away the remaining whey. As little force should be used as possible at first; but, as the first portion of whey is drained off, the curd will acquire more power to retain the fatty matter. Forty or fifty pounds weight will be as much as it can bear at the commencement of the process.

Nearly the whole secret of cheese-making depends upon thoroughly draining off the whey. This carries off the sugary matter of the milk, the lactic acid, and perhaps also the rennet. These substances are so liable to undergo changes, that cheese-making altogether depends upon this process being properly attended to. In some places even the curd is washed; for little injury beyond the danger of washing out a little butyraceous matter would be sustained, compared to the loss incurred if the cheese were suffered to retain any considerable portion of the whey. Besides, as butter is sometimes churned from this whey, the loss is made up to the dairyman, if not to the consumer, in another way.

So powerful is the tendency of the albuminous matter of the casein to putrefy, that even cheese itself will not keep unless the salting process in one shape or another is adopted. This is performed in the manner most favourable to the production of the peculiar kind of cheese for which a district may be famous, and is either added to the curd, or *rubbed in* after the cheese is made and strained. Such is the affinity of salt for moisture, that it will soon permeate the whole mass of the cheese, and preserve the casein from putrefaction by its peculiar antiseptic qualities.

The next process is that of *drying and turning*; but as these are matters of detail, which will come under review shortly, they need not be here described. The only remaining subjects requiring notice, are the general care and attention necessary to be exercised, in order to preserve the character of the cheeses of a district, whatever the peculiarities of manufacture may be.

If scrupulous, nay, fastidious cleanliness be necessary in the process of butter-making, it is equally necessary for the making of cheese. The flavour of a cheese may be much more easily destroyed even than that of butter. Decaying matter in the dairy will send out its sporules, undiscernible even by the microscope, and infect the whole place with its miasmatic influence. So long as the dairy is not a separate room in the house, kept aloof from the food of the family, from the decay and putrefaction of animal and vegetable matter, unconnected with household duties, and in the most absolute state of cleanliness, there will be injury and loss to the dairyman.

Allusion has been made to the taste of turnips inseparable from the milk and butter of cows fed on that root. As the bulk of the cheese is made in summer, the remark does not so far apply to cheese; but it is not unapt to obtain a flavour from any herbs upon which the cow may have specially fed. This aroma of the milk may be often removed by the addition of a little saltpetre; and Mr. Huxtable recommends a few drops of chloride of lime, to remove entirely the taste of turnips. We know a clever dairy-woman who evaporates the essential oil of the turnips in a very ingenious way: As soon as the milk is strained—"siled," as it is locally and technically designated—she adds a gill of boiling-hot water to three gallons of milk. This seems to have the tendency to distil out the aroma of the turnips in a very complete manner, both from the milk and its products. A little prudence, however, will generally obviate the injury arising from any special kind of food with which the cows may at any time be fed.

The *inoculation of cheese* is one of the refinements of modern taste and luxury. A blue mould is by some considered the *sine quâ non* of a tasty cheese; while others prefer the decay to be grey, and the cheese to be in a state of putrefaction so absolute as to be soft and wet—a nidus for mites and the jumpers!

If it be desired to give to a cheese, especially a Stilton, the flavour peculiar to one of its kind, it may easily be accomplished. A dozen holes may be made in the specimen to be operated upon, with the common cheese trier, and the pieces taken away. The same trier may cut as many pieces out of the favourite cheese, and insert them in the places from which the others were removed. This, covered up in a close place for a month will, if free from mould before, turn out absolutely ripe, and be of the same flavour as the cheese from which it was inoculated.

THE DAIRY SYSTEMS OF LONDON AND OTHER LARGE TOWNS.

The Dairy Systems of this country resolve themselves into three—providing supplies of milk for the population of our large towns, which are becoming every year more important and extensive; the making of cheese to suit the various tastes of our population, who may be said to use it almost to a man, in a greater or less degree; and the production of butter, almost as extensively used by the bulk of our population. Of all the large towns in the kingdom, the supply for the population of London is the most important matter; and so great were the secrets of a London establishment deemed, that it was with the greatest difficulty Mr. Youatt, when writing his Treatise on British Cattle, could gain the information he required. Access to the dairies in London was absolutely refused, though in the country he had but to ask, to obtain assistance, and even hospitality. Those who take a strong view of the adulterations of milk will attribute this to a dread of exposure; but it may very readily be believed that the joint-stock dairies, which at one time threatened to swamp the trade of the private dealers, might have some reason for wishing to keep their secrets to themselves. Whatever may have been the cause, it must be admitted that we scarcely know anything respecting the London dairies, but what is furnished by Youatt's authority—we mean that of Mr. Laycock's and Mr. Rhodes's establishments. The number of cows in 1834 he gives at 12,000; but, although London has increased, since the period when Mr. Youatt wrote, at least one-fourth, we should be surprised if the increase of dairy-cows had been very great—or if they had even increased at all. The railway system has introduced a completely new mode of supplying our large towns with milk. The very notion of a milk establishment in a large town at all, has in itself become an anomaly. To drive large herds of cows through crowded streets, to provide them their food, to convey away their manure, and to obtain litter, air, and water, were no ordinary difficulties. But these were difficulties infinitely short of the transport of milk from a distance. If milk had to travel five or ten miles—and the least of these distances it must have travelled—it would have incurred great risk, in summer at least, of being converted into butter when it arrived in the city. The railway system has brought fresh milk from the country in less time, and with less injury, for a distance of twenty miles round London, than was formerly incurred in conveying it from the milkman to the consumer. But the railways have also cheapened the food. The environs of great towns have not now the monopoly of the sale. Clover and turnips are brought thirty and even forty miles, with much more rapidity, and are much fresher, than formerly, when the distance was only seven; and though they are sold by the pound, they are much cheaper, as compared with what they were even ten years ago. The monopoly has been spread over a much greater surface. The somewhat large sum of £82 per cow was given as an estimate of her produce per annum, as obtained by the retail dealer; and the gross sum expended in milk and cream in London at nearly one million sterling—not a large sum per head for the population, nor a large sum for the wholesale dealers and retailers, when the art, the labour, the time, and expenses of food and rent, are taken into consideration.

The milk is sold by the dairymen to the middlemen retailers. These take off the cream, and mix it with water for sale, boil the skim-milk, and sell it warm from the fire. There is no such thing as new milk in London: it is all boiled skim-milk. Mr. Rhodes's establishment, one of the largest in London, stands on an area of about two-and-a-half acres of ground, which has a gentle slope towards the east. The cow-houses are in a line with this slope, and are furnished with drains behind, and a long trough before. In the one their food and water are allowed to run, and down the other their droppings and drainings discharge themselves. The stalls are arranged on each side of the gutter. These stalls are double, two cows being placed in each, and each cow having a manger and a covered water-trough let into the wall. The cow-houses are twenty-four feet wide, and eight feet high, lighted with glass, and well ventilated. Of these cow-houses there are four long rows; and at the bottom is a quadrangular yard, surrounded by similar sheds, partly used for feeding the drape cows, and partly for keeping pigs, which feed on the refuse-food of the animals. Four or five hundred cows, which are usually kept in the establishment, supply milk, varying with circumstances, and sometimes, of course, beyond the demand. Where this is the case, the milk is skimmed, and, being placed in a large souring cistern, is given to the pigs. This, and the grains which may be left after the cows are fed, are almost their exclusive sustenance. Near this quadrangle is the dunghill, after the American fashion—a plan of all others the most desirable in a large town, from being so much excluded from the air, and affording the best opportunities for its innocuous removal. The cows are never loosed, so long as they are milkers. They usually come in from Yorkshire or Durham, often purchased at Barnet fair, and are all newly calved. They are fed mostly on grains and hay. Sometimes, as we said before, clover and grass, tares and mangel, are brought from a distance; but the system of feeding on fermented and preserved brewers' grains is more or less general, because they are known to have the most wonderful effect in promoting the secretion of milk. Those of the ale-brewers are preferred to the porter-brewers; and they are preserved in a pit sunk in the establishment, lined with brick and cement, trodden down and kept air-tight. An incipient vinous fermentation takes place, which runs into acidity: and the whole mass is soured, the same as the milk for the pigs, but with this difference—that in the one case the air is freely admitted, while in the latter case it is carefully excluded. Here keeping is said to improve the grains; and months, and even years, are permitted to elapse before they are consumed. Of these the cows have about a bushel per day. Hay in winter, and tares and cut grass in summer, eke out their soured grains, with a daily allowance of salt, keeping them in high condition; and they will give, on an average, nine quarts of milk per day. If they do not give this quantity, or within one quart, they are at once condemned. Mangel-wurzel, turnips in small quantities, and even potatoes, are given in winter. The change from the open air to the cow-houses of London is very great. It might be supposed that it would have a ruinous effect on their health and condition. But this is not the case. They are usually confined only for eight or ten months; and this is not long enough to produce much damage. The change in their food, also, is rather favourable than otherwise; and the currying of the skins, which is universally adopted, has a very beneficial tendency in overcoming the want of exercise. The cows, when they cease to be milkers, are generally sold to the distillers, though some dairymen send the best specimens to the bull. The general system, however, is to sell them off; and for this reason the Yorkshire cow is so generally the favourite in the London dairies, because she is of more value for fattening than almost any other, and gives a larger proportion of milk, although it be of a less nourishing and poorer quality.

In the establishment to which we have alluded, and at the end opposite to the pig-houses, is the suite of rooms used for the dairy. Here are three rooms—a measuring room, where the milk is measured to the retailers; an inner or scalding room, where the vessels are kept and washed, and which is furnished with a boiler and tables; and the inner room, or dairy, for the unsold milk. The retailers usually milk the cows themselves, at four o'clock in the morning, and three in the afternoon. They take the produce of one, two, three, or more cows, according to the demands of their customers, but have their supply either added to, by the dairyman, from the produce of other milch cows, or they pass over the quantity they do not require, if they have procured more milk than they have demand for. The dairyman makes butter of the surplus milk, and gives the skim-milk either to feeding, or more generally to breeding and store pigs, soured as has been described.

THE LIVERPOOL DAIRY SYSTEM

Is different from that of London, because it is more connected with the farming operations around that town; and we cannot select for remark anything so complete in that neighbourhood—if, indeed, anything in the country is half so perfect—as the system of Mr. Littledale, of Lisceard. His dairy, though much smaller than the London one we have named, is carried on with a spirit that rather reminds us of Mr. Harley, of Glasgow, who remodelled the whole dairy system of towns, than anything else with which it can be compared. Mr. Littledale's farm, of 350 acres, is made subservient to this purpose; and his farm-buildings were especially erected for the purpose of carrying out the system. They cover about four statute acres. His cattle occupy three cow-houses, or, as he calls them provincially, "shippons," and are arranged in parallel lines, with yards between—one holding sixteen, another twenty-eight, and another thirty-two cows. From these yards drains run into liquid-manure tanks; and the cattle are tied by the head in a stall, after the London fashion. His farm grows mangel-wurzel, turnips, potatoes, and green food for his cows; and he also feeds a large number of pigs, as an auxiliary to his dairy. The stalls in the cow-houses are partitioned with blue Welsh flags, connected with iron rods; and each animal is furnished with an iron manger.

A passage before the head of each row of cows, which is single in each cow-house, enables the feeder to supply them with their food without disturbing the animals; and they are never taken from their stalls either for food or exercise. The whole of the cow-houses are laid also with Welsh tiles; and an open drain runs behind the cows, furnished with stench-traps, to convey the liquid to the tanks, by the covered drains from the cow-houses. There is no provision for the conveyance of water; for, being fed so largely on roots, they require but a small quantity; and what they require is carried in pails. In addition to this green food, Mr. Littledale uses a large quantity of grains from the brewery, and gives boiled linseed, as an auxiliary to his roots and green food. His cattle are curried and brushed regularly, and as regularly fed, and though they are, as we said, never loosed from their stalls, they are remarkably sleek and healthy, and free from many of the epidemics which so commonly prevail throughout the dairy county in which he lives—the county of Chester. The ventilation is attended to by means of open-paled weather-boarded ventilators at the top of the cow-houses, by which he is able to regulate the temperature.

The dairy is a very completely arranged building; the floor is laid in cement, and there are two large sycamore tables, one on each side, and one of marble at the end, with three large, but shallow, octagon leaden milk-bowls in the centre. The walls are lined with glazed Staffordshire-ware tiles, and the roof has in it a large ventilator. The walls, which are exposed to the north, are built hollow, having a three-inch aperture, which communicates with the space between a double ceiling, which covers the building, and thus gives an ample command of low temperature in summer,—a higher one in winter being easily obtained. The milk, when cool, is placed in glass milk-pans, and is brought from the cow-house in sycamore pails, with polished girths. The churn is of the old-fashioned cylindrical form, made so as to be worked by his steam-engine, and will churn eighty gallons of cream at one charge. To make this into butter, under favourable circumstances, it requires but some eight or nine minutes.

Though, as may be supposed, profit is not the entire object of the spirited proprietor, there is no doubt but his proximity to Liverpool renders his produce, both in milk and butter, worth a large sum; and as he grows so great a quantity of green crops, and uses these to produce the paying article—dairy produce—he is enabled, as a consequence, to grow large quantities of corn.

Somewhat similar to this was Mr. Harley's dairy, near Glasgow; he kept 260 cows, closely tied by the head; kept them by soiling, and showed the milkmen of Glasgow that he could obtain as much milk by *one* acre soiled, to house-kept cows, as five would produce if the cows were allowed to roam at large. If we take into account the quantity soiled with their excrements, and rendered unfit for food, the unequal manner in which they eat the pasture, which allows much to run to straw, while some is eaten so close to the ground as almost to injure the roots, and the quantity trodden down and destroyed by the cattle lying upon it during the night, and contrast this with the cleanliness, the sweetness, the freshness, of such as have food brought to them, we need not wonder at the statement. The preservation of the whole of the liquid manure enables a dressing of that fertilizing material to be applied to the grass after every cutting, so as to make the most of the productiveness of the soil. A great quantity of this is doubtless saved, which would otherwise volatilize and evaporate.

Perhaps a stronger contrast to the good management of these spirited men cannot be offered than the *adulteration of milk*, unhappily practised in our large towns, and so extensively carried on, that it is doubtful whether some of our population ever taste such an article as the pure milk of the cow. Allusion has been made to the mixing with water so generally practised, and to the partial or total abstraction of the cream before the milk is sold to the consumers. This of course makes it blue and thin; and the least objectionable and most simple resource to disguise the fraud, is to boil it, to thicken the consistency, and improve tho flavour. But far more equivocal modes are adopted. Sometimes sheep's and calves' brains are mixed with it, which render it thick and rich in appearance, and make an apparent rising of cream to the surface; nor is this adulteration easy of detection. Recent statements would, if believed, show that even horses' brains, from the knackers' yards, are sometimes used, as being more easily procured—the brains of sheep and calves being often sold with the heads.

A very old adulterant of milk is chalk and flour, so common a few years ago as to obtain for town milk the significant name of "whitening." This mixture preserved the milk for a longer period, thus enabling the adulterator to take off more of the cream. It became thin, however, by standing, and deposited a sediment, and thus was liable to detection. An improvement in this trick is to adulterate with boiled paste and sugar. A permanent thickness and sweetness is thus given, and it is less easy of detection than raw flour, but is recognizable by the test of iodine. Starch has the same effect, but is liable to the same process of detection. The white of eggs is also sometimes made use of, to thicken the mass.

A refinement on all these modes is to mix the milk with an emulsion of almonds, and even of hemp-seed. Indeed it is questionable if milk itself is not absolutely manufactured from this and some other ingredients. About fifteen quarts of water may be made to resemble milk for less than a shilling; and if a little milk is added the deception will be complete. Hemp-seed emulsion has very much the same effect, but is more easily detected by its acrid taste; yet this may be removed by a sugar or sugar-candy mixture. Raspail detected both these as thickening matter for skimmed milk in Paris; and the researches of Mr. Berruel showed that the deceptive effect, especially of the almond mixture, was nearly complete.—It would be tedious to repeat all the tests for these adulterations. When they are suspected it will be far the best to carry them to an experienced chemist; and the exposure of the parties in a few instances in the public prints would be far more effectual in arresting the villanous process than any personal manipulation, which would not carry the same weight with the public. As a public duty this ought to be done; for the mischief, as well as the disgusting nature of the practice, should at once be arrested.

PRESERVATION OF MILK.

This is by no means an easy measure. Milk consists of materials so protean in their character, that the attempt at preservation so decomposes or transmutes their qualities, that the mixture ceases to be milk. There are, however, many inducements to preserve this invaluable luxury, if it be possible, even for the purpose of transmission from the interior of the country to the large towns; but this can only be effected by preventing the formation of the lactic acid, or the vinous fermentation of the mass; and by preventing the decomposition of the sensitive casein. We must therefore either confine both these principles—the saccharine and caseous materials—by some strong affinity, or we must exclude air and warmth, to effect our purpose. In Holland the milk is mixed with carbonate of magnesia, which thickens it, and prevents it from souring. This, or some other alkaline mixture, will doubtless preserve it for a short period, especially in winter, by forming a salt with the lactic acid, as it is developed, and by keeping the casein in a state of solution. Fifteen grains of the carbonate in a quart of milk will not give it any very unpleasant taste, and will certainly prevent its acidulation and curdling. Carbonate of soda will have a similar effect; and it is thought by some to improve the tendency of the cream to separate from the milk. Possibly the reason is, that with the soda it can be kept so much longer, and thus give it a better chance of asserting its inferior affinity.

Another plan is to place the new milk in bottles, and insert them in a pan on the fire, immersed in cold water, until the water boils. The air in the bottles thus becomes rarefied, and, if corked up hot, will be kept for a considerable time in a state of comparative freshness, to be used immediately the bottles are opened. The addition of a few grains of carbonate of soda will of course much improve its keeping qualities. It should also after this be kept as cool as possible.

M. Adepert's method is a step beyond this. He recommends the milk to be subjected to a heat so gentle that the great bulk of the purely watery parts will be evaporated; then to be closely corked up. This, of course, has a much stronger tendency to resist decomposition than if the whole of the watery particles remained. If it were boiled in the bottles in which it was to be finally corked up, and this during the hot state, as in the instance above, with a small addition of soda, it might keep in a palatable condition for a considerable period—not indeed to compete with newly-produced milk, but to be a luxury on board a ship far out at sea, without any fresh supply of that nutritious article.

Duchoff, a Russian chemist, went even beyond Adepert, and his scheme professes to be perfect, furnishing a supply of milk for any length of time, to be used at pleasure. It is by forming essentially a milk powder. He proposes to evaporate, by a slow fire, the whole of the watery matter from the milk, and thus have a solid and pulverulent mass, which may be kept in a small compass in a bottle, and when required be dissolved in a proper quantity of water. Now, as milk contains water in the ratio of nearly nine-tenths of its substance, it may, possibly, be much reduced in compass, and made capable of being produced extemporaneously at pleasure. This would supply a great desideratum. It is extremely doubtful, however, whether it would preserve the taste of the milk, however much it might retain its nourishing qualities.

THE OPERATION OF MILKING

Is one which has more to do with the success of dairy management than is generally supposed. It must be performed carefully, thoroughly, and kindly. The cow must be educated to give her milk freely, and this can only be accomplished by a system of kind treatment when she is a heifer, and has produced her first calf. Many a cow, physiologically capable of being a good milker, is spoiled at the very outset by unskilful treatment. The new sympathies and sensations of the mother are very decided and very painful. The vessels of the udder are strained and sore, and a rough and brutal treatment of her at this time will stamp her as a vicious cow for ever. She will withhold her milk, become a hard milker, and will thus, by retaining the contents in her udder, meal after meal, soon run off her milk, and become prematurely dry. Nothing can be more utterly injudicious than the mode adopted by too many dairymen, of taking away the calf the moment it is dropped, to prevent the mother from seeing it till she cannot distinguish it as her own. A greater violence done to common sense cannot be imagined. The udder is distended and painful; and nothing is so calculated to soothe and relieve it, as the mucous covering of the mouth of the offspring; nor will anything be so grateful to the mother, or cause her so readily to give up her milk with ease and facility in milking. At first the teats are gummed up by a glutinous sort of cork; this should be removed with the hand carefully, or by the application of warm water. A little of the beestings should be milked into the hand and rubbed on the teats and udder; and then the calf should be assisted to milk. If the udder be very full and distended, a little milk may be carefully extracted by an experienced milker. If the calf be feeble it may have a few spoonsful given by the spoon; only, however, that it may the more vigorously attack its mother. When the calf is satisfied, the udder should be stripped clean. On the second day it should be placed in a stall near the cow, to attract her áttention, and be let out only just before the milking hours, which, in newly-calved cows, should always recur three times a-day at least. This should be practised for a fortnight, as all calves should have new milk for at least that period, and then the hand milking may be altogether substituted. She gets a habit of docility from instinct, and gives her milk with cheerfulness and pleasure; but if, with a sore udder, without her calf and its mental influence as well as its physical upon her, she is left to brood on her unsatisfied instincts, she becomes peevish and sulky; the period of milking, which ought to be one of relief, becomes one of pain and annoyance, and often cruelty; she becomes a confirmed vicious cow, and therefore a hard milker. A young heifer should never be tied at first. So long as the calf sucks, she will not require it; but when tied by the feet she should also have a noose passed over her hams, to prevent her kicking. Three persons should always be sent to milk a young cow—one to her head, one to her hams, and one to milk. If she shows vice or wildness, or kicks at first, the noose over her hams will be a very efficient remedy. Milking should always be performed the very first thing in the morning. Five o'clock in summer, and six in winter, are the latest periods it should ever be performed. In the evening it may be done at five; and regularity in this respect has more to do with success than is generally imagined. The cow should not be driven home, but the milk should be carried from the field, if distant; for a great waste of milk will take place, if they are driven about. If under cover, it is by no means a bad plan to give them their feed at the time they are milked. It assists to quiet them, and makes them part with their milk the more freely; and as most milk cows, in winter and spring at least, have mash, it is desirable to give them this during the milking the first thing in the morning.

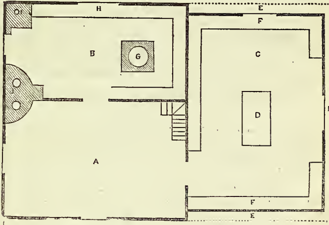
The most important part, in the operation of milking, is perhaps to *milk clean*—to take out the whole of the milk from the udder. Not only is the last portion the richest in cream and in butter, but there is not a more certain way of drying a cow than allowing a part of her milk to remain in the udder. It is a good plan, but too generally neglected, to wash the udder with warm water before milking. Nor is it of less consequence to have a good-tempered and expert milker. A savage ill-tempered milker will often spoil a cow; and, if she once holds up her milk, it is a proof that the milker is defective or disagreeable to the animal, either from her disposition and temper, or in the manipulation of the udder. Pleasant milking is that which sensibly relieves the cow's udder. A free, decided, but gentle grasp of the teats, and a full and vigorous stream of milk, are the marks of a successful milker. It is desirable to rub and stroke the udder when the stream ceases, to encourage the delivery of the slightest remains; nor is it a bad plan for the milker, or, in large dairies, for the foreman, or even master, to take a small measure and follow the milker to "strip" all the cows. There are some masters who make a point of always attending to this at the milking, and they thus see the character and capabilities of the milker. Women are by far the most capable of milking; their hands are more gentle and delicate, and the cows seem generally to prefer them.

There have been several attempts to accomplish the milking by other means than manipulation. Some syphons were invented, which were alleged to have the peculiarity of clearing out the udder without the use of the hand. But this has not been found so successful as to obtain any wide-spread use; or indeed to be much known, even amongst experienced agriculturists. It is obvious that there are only two modes of overcoming the tension of the udder, likely to effect the purpose. The one is compression, the other is suction. The syphon went on the erroneous principle of distending the mouth of the inner duct of the milk in the teats. This is a disagreeable process, and would subject the cow to a flaccid state of teat, likely to induce her to commit the fault of milking herself.

An American plan, recently mentioned in this country as practised in the United States, is much more feasible. It proceeds on the two principles we have named, and consists of four India rubber bags, which are drawn over the teats, and set so as to be air-tight. At the lower end of these, metallic tubes, with taps, are inserted. When the adjustment is perfect the taps are turned, and the whole of the milk in the udder is said to be thoroughly exhausted, and in half the time required for hand-milking. It is said that a man can milk ten cows thoroughly in fifteen minutes. It requires, perhaps, more experience than has yet been obtained, before it could be recommended; but the idea is novel, and not altogether void of feasibility.

THE DAIRY.

This may be classed among the most important branches of rural husbandry; and its success depends on various contingencies. The dairy should be kept apart from all household operations, from open grates and from dung-heaps, and should have as much as possible the means of



A	Churning-room.	F	Table for milk bowls.
B	Cheese and scalding-room.	G	Curd pan.
C	Dairy.	H	Tables round.
D	Table.	I	Pump.
E	Verandah.	J	Boilers for scalding.

an equable temperature. As, however, it is much easier to keep a cold building warm, than to cool a hot one, it is desirable that it should be as much as possible shielded from the sun's rays. It should have its side to the north, its end to the east, and, if possible, be let into the earth a few feet, but not so deep as to interfere with the drainage. If covered by a large tree it would be all the better. Around it should be either a hollow wall, or peat earth should be walled round its exterior; or, as another alternative, and possibly the best but most expensive, it should be surrounded by a verandah. It should also have a double roof, and abundant top and side ventilation —either of which should admit of being closed. It is necessary to have in it a pump, and the floor sloping. On the highest part a perforated pipe should be connected with the pump, to allow of the cleansing of the floor when necessary with cold spring water. The bowls should either be earthen-ware or glass dishes, placed upon wooden tables—fir, maple, or sycamore being the best—or leaden bowls may be used, placed on frames, and surrounding the dairy. Slates are the best for the floors, and a lining for the walls, of white pottery, is not only elegant, but useful. A pipe connected with the boiler attached to the kitchen fire, with a stop-cock, so as to regulate the heat of the room in winter, is a great advantage. The scalding and churning rooms should be distinct from the milkhouse, and the latter should be kept as free as possible from all kinds of foreign matter. An outer verandah is useful for drying the dishes and pails, and therefore desirable, when the dairy is sufficiently extensive to render the expense of its erection judicious.

In the sketch on the preceding page we give the plan of a dairy which combines the whole of these advantages.

Following the order already indicated (of first describing the butter-making, and afterwards the cheese, and then reviewing the various systems adopted in the most celebrated dairy districts of the kingdom), we shall enter upon the subject of

THE AYRSHIRE DAIRY SYSTEM.

Ayrshire is a district celebrated in Scotland and in the north—and justly so—for the manufacture of *Dunlop cheese*. These cheeses are from two to four stones in weight; and hence to make one large cheese at a meal requires a dairy of at least fourteen cows. In this case a cheese is made night and morning; but if a smaller dairy is kept, the night's milk is reserved till morning, the cream skimmed off, and both warmed, so as to make the whole mass 90° to 95°. Following the course of the large dairies, however—those where the cheese is made in the greatest perfection, namely, from new milk as it comes from the cow—a large cheese-tub is placed in the dairy, and upon this is placed a frame-work of wood, denominated a ladder. Over the whole is placed a thin linen strainer, and the milk, if sufficiently warm, viz., at least 85°, is strained through this cloth into the tub. If, however, it should not be of that heat, it is placed in a deep tin or copper vessel, and inserted in a furnace of hot water, until it attains the requisite degree of heat; for all the success of the cheese-making from the rich milk of the Ayrshire cows depends upon this precaution. If the cheese is made from milk of a less heat than this, the curd does not contract properly, and some is wasted in the whey; nor is the cheese so compact; whereas, if it is much hotter than 90°, except in winter, when it cools down considerably in the very operation of making, the cheese will ferment, and the casein run through its various stages of decay.

The next process is that of adding the rennet. This consists of the stomach of calves, at least one year old, steeped in salt and water, in the ratio of three to the gallon; and in the best-managed dairies a lemon is added to take off the bad flavour. This stands for about two months, and is called *yirning*. A tablespoonful of this solution is added to each hundred quarts of milk, and the whole is covered by a woollen cloth to prevent the escape of the heat.

When the curd is sufficiently firm for breaking, usually about a quarter of an hour after the rennet has been added, it is cut in all directions—a knife with three blades being preferred, as expediting the process—so as to have the curd in cubic pieces. It then begins to sink, and as much of the liquor (whey) is taken out as can conveniently be removed in a wooden dish. The cutting of these cubical pieces again commences, slowly and cautiously at first, to break the curd as little as possible, but more rapidly afterwards, until the whole of the pieces are thoroughly divided, and made quite fine. It is then allowed to settle for some fifteen minutes, and the whey again taken from it with the dish, and strained through a fine hair-sieve, to arrest any of the small particles of curd which may be taken up with the whey. The curd is then cut out, and laid in a heap in the tub, to allow the whey still to drain away, but only by the pressure of its own weight; and when all the whey that will leave it has been so expressed, it is placed in the cheese-vats, which were before covered with a cloth. It may remain there for half an hour, under pressure of about a stone weight, to press out the remaining whey; but leave the fatty or butyraceous particles in the curd. It is then takon out and cut into slices, and again subjected to a greater pressure, aud either broken fine by the hand or torn in pieces by a curd-mill, until it becomes almost reduced to crumbs. It then undergoes the salting process, which generally takes place at the rate of 7½ ounces of salt to the English stone of cheese. A fine linen cheese-cloth is now washed in warm water, wrung, and placed in the chessel, or chessford, and half a hundred-weight laid upon it for an hour. This is doubled for another hour; when the cheese is taken out, placed in another cloth, and again put under an increased weight for about three hours. This continues for about four days; every time changing the cloth, and generally turning the cheese upside down; and the weight is increased until the cheese arrives at a degree of consistency to bear the pressure of a ton.

When taken out of the press the cheeses are placed in a very dry and rather warm atmosphere, often within the range of the influence of the kitchen-fire, turned several times a-day, and rubbed with a dry cloth. This continues for a week or ten days, when they are removed to the cheese-room, where they are exposed to a cool dry atmosphere; a gradual mode of ripening being, at this stage, necessary to their proper condition. The Dunlop cheese is seldom coloured, though some herein imitate the Gloucester and Cheshire fashion. The peculiarity of management is that of making the cheese from the milk from the cow before it cools.

THE CHESHIRE DAIRY SYSTEM.

The Cheshire cheese is as celebrated in England as the Dunlop is in Scotland, and it has long received the greatest attention from the Cheshire dairymen. The evening's milk is set up until the morning, when the cheese is generally made, and the cream taken off. The skim-milk is scalded to about 100°; and one half of it, mixed with the new milk from the cows of the same morning, is strained through a fine hair or gauze sieve, while the remaining half is mixed with the cream, which is also added; so that the whole mass is about 83° to 85°; the annatto being added to the mixture in the proportion necessary to give the colour aimed at in that particular dairy. Two pounds of annatto is generally considered sufficient to colour a ton of cheese. The rennet is prepared exactly in the mode described in speaking of the Dunlop cheese, and added in about the same proportion. The tub is then covered with a wooden cover, and a cloth placed over it to keep in the heat. It remains about an hour in this condition. The curd is then gently but thoroughly cut with a cheese-knife until it is divided into small pieces, and is again left covered for an hour to settle. The whey is then taken out by a pan or dish; the dish being pressed gently on the curd, to gather up the whey. The curd is laid on a heap in the tub, and gently pressed. As more and more of the whey separates, the curd may sustain the greater amount of pressure without fear of forcing out the fatty matter. A perforated board is placed over the curd in the tub, and a weight, of from twenty to twenty-five pounds, placed upon it, and again the whey is baled out. It is then turned, and the same board, with a greater weight, placed upon it. It is then cut into square pieces, and pressed once or twice, when it is fit for the vat or chessford, which has in it a coarse cloth. Before being put in, the curd is broken into smaller pieces and salted, then piled up in the chessford, and covered with the cloth by having its edges turned over it. As soon as the curd adheres, a cover is placed on the chessford, and the whole is pressed by a thirty-pound weight. The curd is then punctured on all sides with skewers to admit of the free escape of the whey. It is taken out, cut in slices, and again subjected to more pressure, and more punctures by the skewers. The pressure is again increased, and the cheese frequently turned and the edges pared, the parings being placed on the top of the cheese, and pressed into the centre. A pressure of sixteen hundredweight is now given, the cloth changed, and the cheese turned several times in forty-eight hours; then taken out, and immersed in or covered with salt. It is sometimes salted by washing it with salt brine, and is, when taken out of the chessford, placed in a cylinder or hoop of proper dimensions, when it is washed in warm water, dried with a cloth, and placed on a shelf to dry, where it is allowed to remain a week. It is afterwards washed and dried again, and anointed with fresh butter. It is placed in a somewhat warm situation, and rubbed every day, for one week more, with butter, which much improves its character, and, above all, its appearance.

The writer has been favoured by the Rev. Robert Pulleine with the following account of an improved mode of making Cheshire cheese:—

The cream is taken off the evening's milk, and the milk is added to the morning's. The cream is then slowly stirred into it. If below 75°, a portion of milk is heated in a tin, put into a copper of boiling water, and added to the milk to raise it to that heat. The rennet and colouring liquid (annatto) are then added, and the whole covered over and allowed to stand until the milk is creamed. When the curd is ready to be broken, which is known by its leaving the knife clean, it is cut into small squares slowly, then slowly turned over in the tub with the hands; after that churned with a wire to break it still smaller; again very slowly turned with the hands; then turned again with a board. The whey is then taken from it, a weight being put upon a loose wooden top that covers about half the tub. The curd is carried at once to a larger boiler, where the whey is all taken out; the curd is put into a cheese-cloth, and then into the vat; circles of tin being put to hold it up, and a weight of about 28lb. on the top. It is allowed to drain about ten minutes, and then turned over, and again allowed to drain. After that, it is taken out of the vat, cut up again, and broken with the hand, and then replaced in the vat, salt being sprinkled upon it all the time. The vat and all the cloths are scalded, and used warm. A weight is again placed upon the top of a board, which covers the whole, and it stands until the following month, when it is put into the press, where it remains—being changed two or three times a day—for four days. It is then taken out and bound up. The whey is scalded, and a portion of the whey from the day before is added. The flutings are skimmed off—the first for butter, the second for servants' breakfast, the third for calves. The whey is then mixed with chopped hay for pigs. A skewer is put into the cheese to let out any whey. To make the corners round, the cheese-vat is heated. After being taken from the vat, it is bound round with cheese-filleting, and taken to the drying-room.

WHEY BUTTER

Is a product of new milk dairies, and in Cheshire is a branch of dairy manufacture. It was stated, that though much of the fatty matter of the milk remained in the curd, yet some necessarily escaped into the whey. It is already developed, but in a state of feeble union with the whey, and requires a churning process before it can be collected.

Mr. White, in his "Essay on the Making of Cheshire Cheese"—a very elaborate and pains-taking document—states that one hundred gallons of milk made into cheese, will give ninety gallons of whey. This will yield twelve gallons of fatty, creamy matter, which, when churned, will give some four pounds of butter. The mode of treating the whey is to heat it to about 180°. Afterwards it must be well stirred to prevent it "setting on." At this stage some sour buttermilk is added, and occasionally some white whey, in the proportion of about 1 to 1·70 of the former, and one-tenth of the latter. This causes the butyraceous matter to rise to the surface of the pan, when it is skimmed off and placed in an earthenware jar, to take exactly the course of fresh cream—to form lactic acid, and separate the casein from the mass. The remainder of the whey is then allowed to run off from the oily matter, which swims on the surface, and this is churned the same as the ordinary cream. The whey butter is an inferior kind, worth about 20 per cent. less than milk-butter, and is mainly used for pastry purposes.

THE LEICESTERSHIRE DAIRY SYSTEM.

This fertile county, partly grazing and partly dairy, is a mixture of arable and grass land; and the pastures being, on the whole, rich, and the land productive, a large portion is grazed by cattle. On some farms, however, the dairy is the principal object; and the land enables them to produce a cheese perhaps unequalled in richness. We have hitherto only had our attention directed to new or whole-milk cheese; but a step beyond this may be gained. If some of the skim-milk be rejected, and the cream added to the new milk, we have a still richer cheese—the product for which the north-eastern parts of Leicestershire are famous: we mean the far-famed *Stilton cheese*. This cheese differs from the Dunlop as regards shape, and from the Cheshire both in shape and bulk. The latter may be from half a hundred to two hundredweight, though perhaps the former is nearer the mark; but the Stilton seldom weighs more than from twelve to fourteen pounds, and is the shape of a round hat without the brim. They are generally made by adding to the new milk of the morning the cream of the milk given on the previous evening. If a richer cheese is required, more cream is added; and even butter is sometimes said to be added, to enhance the peculiar richness of the Stilton cheese. The temperature should be about the same as for the Cheshire—85°; and this is attained, when necessary, by inserting jugs of hot water in the mixture. The rennet is added without any colouring matter; and in an hour the curd is fully formed. Great care is necessary in removing the curd. If handled roughly, or squeezed at all, the cheese is seriously injured. It is usually gathered carefully off the whey by a wooden dish, and placed upon a linen strainer, which is tied together at the corners, after the manner of making cheese-cake curd; and the whey gently strains off by the pressure of its own weight alone, into a vessel beneath, which receives it. A little squeezing with the hand, or with laths, is then given; and the whole is allowed to drain six or eight hours, in moderately warm weather. It is then placed in a cylinder of copper, zinc, or tin, which has numerous perforations at the sides, being first secured in an open or coarse strainer; gently cut in slices from the first strainer, with a sharp knife. In this hoop it remains for four or five days, being turned every day once or twice, and punctured with skewers through the holes of the cylinders, after the manner of the Cheshire. Warmth is requisite to the ripening of this description of cheese.

When the curd has become solid, the cheese is removed from the cylinder, and bound up in canvas bandages, or rollers, which encircle it several times. These are clean and dry: all cracks are gradually filled up, and fresh binders supplied every morning for a week or two, until the much-prized skin is formed; after which, they are removed to the drying-place or chamber. It is two years, however, before a Stilton cheese is at full maturity, except when its ripening is hastened by the method of inoculation described at the commencement of this chapter.

THE GLOUCESTERSHIRE DAIRY SYSTEM.

In this district, celebrated for its *double Gloucester* cheese, the practice is not so entirely dissimilar to the Dunlop and Cheshire modes as to require a very minute detail. They weigh usually about twenty-two pounds each, and are a rich and useful cheese. The single Gloucester—or one-half new milk, and one-half blue, or skimmed—are disappearing from public approbation. The milk fresh from the cows is taken and mixed at once with the rennet and annatto, and left for an hour covered up, to prevent the escape of the heat, which is maintained, so far as it can be, at the same degree as in Cheshire; and the curd is broken by a knife with three blades, or a sieve made of wire. The whey is taken out with a wooden dish, and is placed in the vat, over which a linen cloth is spread. Into this cloth the curd is put, and pressed with the hands until it will bear the cover of the vat, which is then placed upon it, and loaded with a weight, or it is placed in the cheese-press. The curd is then torn in pieces by a curd-mill, and again placed with a clean cloth in the vat, and pressed. In four or five days the curd is thoroughly deprived of the whey, and is taken out to undergo the process of drying. It may be observed that salting has not been described. No salt is mixed with the curd; but it is rubbed upon the exterior of the cheese, some twelve to twenty hours after it has been put in the press. It is rubbed in with the hand, so long as the curd appears to absorb it; and the cheese is again transferred to the press. This takes place three times each day; and the quantity of salt, allowing for waste, which a cheese of twenty-two pounds will absorb, will be about ten ounces. When taken from the cloth, they are wiped, and laid to dry in the ordinary manner, at the same time being frequently turned. When intended for sale in London, they are scraped and painted. A coat of red colouring matter, dissolved in ale, is used, which is rubbed on the cheese with flannel. Of course, this has no beneficial tendency.

THE DEVONSHIRE DAIRY SYSTEM.

This is peculiar, especially as regards the manufacture of *butter*. It is said that the process adopted there is one productive of more butter, and that of a better quality and more agreeable flavour, than any other. The cream, before churning, undergoes the process of *clotting*, or *clouting;* and the *clouted cream* is thus procured: As soon as the milking and skimming processes are over, the warm new milk is placed in a brass pan, sufficiently capacious to hold the meal. A small quantity of cold water is placed in the pan; and here it stands in the day-time for six hours, or at night till the following morning. It is then carefully placed near a slow charcoal or coke fire, so as to be heated to a certain point, but not permitted to boil. It is a delicate matter to have a fire just brisk enough to prevent the milk from curdling in summer, and still not so hot as to cause it to heave or boil. A firm consistency on the surface, and a tough, consolidated appearance, are the criterions usually depended upon for the proper amount of heat.

When sufficiently scalded, the pan and its contents are removed to a cold place, in summer, and covered over until cool with a woollen cloth, in winter, when the cream is taken off. The churning may then either be performed at once, or delayed a day or two; but no souring is necessary in this clouted cream—a reason why the butter may be considered more palatable to some tastes. The process of churning is very simple: the cream is placed in wooden bowls, which are alternately scalded with hot, and washed with cold, water—a process which, by evaporation, is said to cool them beyond anything else in which the cream can be placed. It is then briskly stirred by the hand, or by a "whisk" of peeled willows, until the buttermilk separates from the butter, which is usually effected in some ten minutes. The buttermilk being poured off, the butter is washed with fresh water, a little salt added, and the butter repeatedly beaten either by the hand or with a wooden trencher or spatula. It is then formed into small cakes, and impressed with either the peculiar device of the dairy, or some fanciful emblem, and is ready for the market.

THE YORKSHIRE DAIRY SYSTEM.

The dairy husbandry of Yorkshire is a combination of the ordinary operations of some four distinct classes of dairy-farming. The one is the making of butter in rolls, stones, or firkins, for the manufacturing districts of the West of England, and is often combined with the making of *skim-milk cheese*, or "whenby," as it is provincially called. The other is the making of new-milk cheese, practised in *Wensleydale*, and, to a small extent, in *Cleveland*. These two latter modes we shall not describe, as they are not materially different from that of other districts. The last is the making of cream-cheese, which is mainly confined to the valleys of the West, though known as *York cream-cheese*.

The arable land having for many years past encroached on the dairies, by the breaking up of the grass-land, the *Yorkshire butter* is usually made from dairies of from six to fifteen cows. In summer, the milk, after straining, is placed in a large brass "kettle," or cooler, and often stirred, to dissipate the foam, and prevent the setting of the cream. In winter this process is unnecessary, and it is at once strained into leaden bowls, in which it is usually kept; a little hot water being added to the milk in winter, to evaporate the aroma of any roots the animal may have eaten; and in summer a little cold water is added, which is said to facilitate the separation of the cream. In winter it remains twenty-four hours in the bowls; in summer, twelve, and even less; for the dairywoman watches the milk with the assiduity of a haymaker in a showery hay-time; and on the least advance of heat, or tendency to thunder, she separates the milk from the cream. The bowl contains a plug in the bottom. This is taken out, and the milk runs off, the plug being returned, to arrest the flow of the cream. The cream is then also let off into an earthen vessel, or pancheon; and the leaden bowl, being nicely scraped with a thin piece of horn, is carefully washed and scalded, and is ready, when cool, for the next meal of milk. The cream is kept in these earthen jars, or vessels, and frequently stirred, and in winter placed before the fire all night, to acquire the fermentation necessary to an easy and rapid churning. If the cattle have had turnips, a little saltpetre is added to the cream; and if there is no recently-calved cow amongst the dairy herd, a little rolled annatto, or, what is better, an infusion of grated carrots is added, to give the butter the colour requisite for the taste of the markets. The cream is then strained again into a clean and well-scalded churn, which is turned gently at first, and frequently vented, to allow the escape of the air accumulated by the churning. When this escape ceases, it is turned briskly round, and, if all is right, will be churned in twenty minutes. If the process is slow in winter, a little hot water is added, the sign of the formation of butter being the watery sound in the churn, and a semi-curdled appearance on the vent-cork, called "shill." As soon as the cream is in shill, the churn is turned much more carefully round, and the butter begins to collect. As this goes on, a little of the buttermilk is let off; and the butter, when finally collected and freed from all the remaining buttermilk, is placed with cold water into the butter trough, being washed and kneaded several times in fresh supplies of cold spring water. It is then salted, and either worked into pounds, which usually consist of about twenty-four-ounce rolls, or is rolled up into lumps of fourteen pounds called "store butter." In other cases it is put away in wooden casks, called firkins, usually a mode in which it is preserved till the winter, and then made up into pounds, by being washed in milk and resalted. In this state it is sold to their customers by the huxters, who think a little rancidity is not too great a penalty to pay for escaping the taste of turnips, so common in winter-made butter.

BLUE-MILK CHEESE.

This cheese is made in the great butter dairies, and is a sort of accompaniment to the combined dairy system of Yorkshire. The milk, while sweet—which is one reason why the dairywoman must be stirring in summer by three or four o'clock in the morning—is placed in a kettle; the rennet is then added, with the annatto colouring, and the whole mass heated to something like blood-heat; the hand being the general test of its extent, and perhaps 90° being the nearest approximation. When the curd is formed, it is laved out with a dish into the butter-trough, and the whey allowed to drip from it through a hole in the bottom. When all the whey has escaped, it is either broken very small by the hand or placed in a curd-mill. Having little of the butyraceous matter present in whole or new-milk cheeses, there is less fear of manipulating the skim-milk curd than there is in the cases of Dunlop and Stilton. A cloth is then spread over a chessford, which being put in a press is turned every night and morning, till the whole of the whey is expressed; the cloth being changed every turning. It is then put away to dry and ripen. It was once a favourite commodity for a morning or evening meal for the farm servants, with bread and milk. They now, however, dislike and despise it, and have oftener animal food three times per day than anything else. It is used with bread and ale for their "drinkings" in harvest.

THE YORK CREAM CHEESES

Are not, as the name would purport them to be, made at York; but are chiefly produced in the poorer valleys at the western extremity of the county. The village of Gruelthorpe has the envied celebrity of making the best cream cheese—a great trade with London, and all parts of the kingdom, being carried on by the inhabitants of this locality. The process is simple, and depends, like almost all other dairy practices, on the most scrupulous regard to cleanliness, and perfect freedom from the taint of all kinds of putrefaction. There are two kinds of cream cheeses: one is made by simply placing the cream in an oblong tin case perforated with holes, from which the milk and watery portions of the cream leave the thick cream, to which a little hand-pressure is applied. But much of the cream cheese is made of the cream coagulated by the "yirning," in the following manner:—Five quarts of the strippings (the last milk given by the cow) are put in a pan, with two spoonfuls of rennet. The curd, when formed by gentle heat, is broken down two or three times with a dish. It is then allowed to stand on a sieve, covered with a clean napkin, for about two hours, when a little pressure is applied by the hand, or by a fluted piece of wood; and it is ready for use in three weeks.

THE WILTSHIRE DAIRY SYSTEM.

This will close our description of the English modes of dairy management. It would not have been introduced, even thus cursorily, had it not been the district which supplies the celebrated *Cheddar cheese.* Although the Cheddar valley is really in an adjoining county, yet the greatest part of the cheese known by that name, and sold in London, is made in Wiltshire. These conical-shaped cheeses very slightly differ from the Dunlop in their actual make. The smallness of their size enables the dairyman to make a cheese for every meal of milk, and also prevents the necessity for so much pressure as is used in some other kind, by which a great quantity of the butter is crushed out. This enables the dairyman to churn the whey for butter, of which mention has been made in the earlier part of this treatise. The only severe manipulation is the breaking of the curd, which is performed in a very minute degree. This enables the dairyman to allow a great portion of the whey to drain off, with no other compression than is given by its own weight; the curd being disposed in a conical form, in which position it remains about twenty-four hours. It is then suspended in an open coarse cloth, or even a net, to admit air freely, and is so small in dimensions, and especially in diameter, that the whey is dried up by evaporation before it becomes rancid or spoils the cheese. The freshness of the milk has also a favourable tendency in this particular. The salt is added to the curd.

FOREIGN DAIRY MANAGEMENT.

Climate, as well as breeds of cattle and pasturage, has some influence on the production of cheese and butter; and though few countries can vie with our own in the excellency of its general dairy productions, still in some respects foreigners are our superiors. Take, as an instance,

THE DAIRY SYSTEM OF ITALY,

Especially in the manufacture of *Parmesan cheese;* which, though partly a skim-milk cheese, is almost equal to some of our very best home productions from milk; it is also in great demand by the epicures of our large cities. From the great size of the cheese, containing sometimes as much as two hundredweight, they often require eighty or ninety cows in a dairy to make them to perfection. Half of the milk is kept one meal, or twelve hours, and then skimmed; the other half a meal, or six hours, and also skimmed. They are then put together in a pan, and heated to a greater heat than English skim-milk cheese—sometimes as high as 120° Fahrenheit. After it has a little cooled the rennet is added, and the curd being formed, the mass is again heated to a still greater heat (140°), taking care to stir the mass rapidly during the heating. This breaks the curd into small pieces, and saves the curd-mill, to which it is said so much of the toughness of the English skim-milk cheese is due. The whey is run off, and the curd coloured slightly with saffron. The mass has then cold water added, to cause it to coagulate and set. It is then collected from the whey with a cloth, and placed in a fixed press. The next day the cheese (for so it must now be called) is taken out and rubbed on one side with salt, and again subjected to pressure. This rubbing with salt is repeated on the other side, when the cheese is again turned, and the process of turning and salting, with the pressure, is continued for forty days. For preservation, the surface of the cheese is rubbed with linseed oil, and a red ochrey coat is given to one side. When the cheese is fit for sale, this favourite production fetches a large price.

Mascarponi cheese is also an Italian production, and partly resembles our cream cheeses; but it is made rather after the Devonshire than the Yorkshire mode. The cream is heated nearly up to the boiling point; and when the butyraceous matter begins to separate, a little sour whey is added to the mass, which forms a sort of curd; this is taken out and placed in moulds—having perforated bottoms, through which the whey escapes—to take such shapes as fancy or custom may dictate; and, when come to a proper consistence, they are deposited in napkins, covered with straw or leaves, and pressed gently with the hand. Sometimes tartaric acid is used instead of the fermented whey, which occasionally containing particles of putrid casein, is apt to give a rancid taste to the cheese, and diminish its keeping qualities. The kind of acid is not material.

THE DAIRY SYSTEM OF SWITZERLAND.

The Swiss butter has the remarkable peculiarity of keeping for ten or eleven months perfectly sweet, without any admixture of salt. Some attribute this to extra diligence and care on the part of the dairy people in expressing the buttermilk, and to the peculiar mode of preservation adopted; but in all probability it is due to the cool and highly rarefied air of the mountain-districts which are the most favourable for its preservation. The butter is made every day, so that no decomposing putrescence takes place in the cream. When made, it is washed with the greatest care, and a great deal of kneading and compression in the pure spring water of the district takes place. It is then deposited in the following extraordinary manner: A narrow board is fixed across the dairy, like a kind of shelf, but in the part where it is most exposed to a free current of air. To the surface of this are attached a row of wooden spikes some two or three feet long. As the butter is made it is plastered to the top of one of these spikes; and so the deposit of butter continues to accumulate every day till the whole is covered, and each deposit of butter is dried and preserved as it is placed on the pin, but more upwards than downwards, until it forms a sort of inverted cone; the top overhanging the base to permit the more facile dripping of the moisture. In a short time a hard air-tight covering envelopes the mass, and renders it so impervious to air that it will be found perfectly fresh for several months.

The *boiled butter* is another mode of preserving the produce of the Swiss mountain sides, and is thus manufactured: A quantity of thirty or forty pounds of butter is placed in a large copper, over a very slow fire, until the whole is gently melted. This slow fire is continued until the whole comes to the boiling point, generally in about two hours, careful stirring at intervals taking place during the whole period. The boiling must be gradually and gently kept up for the same period as it took to arrive at the boiling point, and the stirring still continued. After this it is allowed to cool slowly, which process may occupy about two hours more. The deposited mass of caseous matter, coagulated by the heat, then takes place; and the butter, while just warm enough to pour, is carefully taken off the cheesy mass, and corked up in air-tight jars, when it may be kept sweet, though of course without the flavour of fresh butter, for any number of years. Our climate may, perhaps, be unfavourable to this process, as it is by no means a common one, except where there is thin cold air, and possibly water strongly impregnated with alkalies, which take up the lactic acid of the putrefying cream.

THE HOLSTEIN DAIRY SYSTEM

Is one which turns out very celebrated butter ; and this is only due to the simple fact, that being itself so important a production as to be worthy of attention as a manufacture, all its details are managed with attention and skill, and consequently well done. This can never be the case when it is combined with the perplexities of arable farming. The dairies in Holstein vary from 100 to 1,000 cows, and the establishment consists of a distinct suite of dairy apartments. In some of the best dairies the milk-dishes are placed in a raised brick ledge, forming a sort of open drain, and in hot weather cold spring water is pumped into them, so as to give artificial coolness to the milk in the pans. Sometimes even a large piece of ice is introduced into the dairy, and even into the churn, to lower the temperature when the heat is excessive. Milking is performed earlier in the morning than common. Three o'clock, and even two, are hours at which they are occasionally stirring. The milking takes place at four, and in general at five in the afternoon. The milk is placed in vessels of wood, zinc, lead, glass, or sometimes of various materials lined with china or delf. Of course when the ledges just spoken of are in use, the glass or zinc vessels are adopted, as wood is too slow a conductor of heat to admit of the carrying out of the water-cooling process. The churning and attendance are the same as in every well-managed dairy, but the making of the butter is peculiar. It is never washed at all, a process which is said in Holstein to injure the butter. It is salted about 1½lb. of salt to the stone of butter, and subjected to a good deal of pressure, kneading, and beating, by being lifted up and thrown down again into the trough. It is then allowed to soak or drip for several hours, when it is again subjected to the same treatment. When a sufficient quantity of butter is made to fill one of the casks or firkins, of which there are three sizes made, one containing about a hundredweight, another about ten stones, and the third two hundredweight, it is re-kneaded and packed in a salt-seasoned cask, care being taken to make the cask perfectly air-tight. Skim-milk cheese is also made exactly in the mode in which it is made in England, only on a scale considerably greater.

This brief sketch comprises all that we need say on the leading dairy systems; and in the course of it the peculiar principles which ought to guide the dairyman, in improving his system, have been pretty clearly developed. The large establishment of the dairy husbandman, and the small product of the cottier, require to be directed by the same great essential principles of dairy management—strict attention to the health and comfort of the animals, careful milking, perfect cleanliness in the dairy itself, and closely watching the proper time and weather for the various operations.

COTTAGE AND SUBURBAN DAIRIES.

Although an attempt has been made in the progress of this treatise to describe, step by step, the details of dairy management and cattle keeping, and to elucidate the best principles of management, yet it may be considered desirable to afford to the cottager and the amateur who may have a limited area of land the means of making the most of their resources. The latter has usually two or three acres of grass, the former somewhat less of arable land; and there are modes of management which will enable them both, with proper care and labour spent upon it, to produce double the quantity as compared to ordinarily farmed land.

The *capabilities of arable land* for growing green crops are almost unlimited; and it is scarcely possible to over-rate the productiveness of a small area of land when carefully farmed. Feargus O'Connor, in reference to his land regeneration scheme, gave an estimate of the gross produce of three acres at £95 10s., the expenditure being £51 10s.; thus showing a profit per annum for the labour of the man and his family beyond their keep of £44. He committed, however, two great errors: he forgot the casualties of crops, and pre-supposed land on which a vast amount of labour and capital had been previously expended. But Mr. Dumbrell, of Eastbourne, a cottage occupier of three and a-half acres of pasture and two and a-half acres of arable land, found the produce to be worth £40 4s. for the summer half year, thus leaving, after paying all outgoings, a clear profit of £23 11s. 6d. The remaining six months would be less profitable; but he could not in that year make less than £30 profit by this small quantity of land. Mr. O'Connor proposed that one acre and three roods should grow potatoes, one acre wheat; three-and-a-half roods to be cropped with green crops, and half a rood kitchen-garden.

From this he estimated a produce of fifteen tons of potatoes per acre, and 200 stones of wheat. The produce of the cows he estimated at £36 10s.; the pigs, £20; the wheat, £7 10s.; the potatoes, £14; the flax, of which he allowed a rood, £12 10s.; and fruit and vegetables he estimated at £5; making the above extraordinary produce of £95 10s. Passing over all estimates, however, Dumbrell made from his cows, from the 16th of January, 1840, to the 27th of July in the same year:—

	£	s.	d.
278lbs. of butter, at 1s. per lb.	13	18	0
The skim milk, sold for three pints a penny, or given to the pigs, estimated for the year at	10	0	0
Two calves, sold for	5	18	0
The crops being examined by a competent judge, his estimate was nineteen bushels on the half-acre and eight rods, at the then price of 8s. per bushel	7	12	0
And on the one rood of land growing oats, he estimated fourteen bushels, at the then price of 4s. per bushel	2	16	0
Making a gross produce of three-and-a-half acres of pasture, and two acres of arable land	£40	4	0

The outgoings from the land were:—

	£	s.	d.	£	s.	d.
Rent, taxes, and tithes	12	12	6			
Seed	2	0	0			
Hired labour	2	0	0			
				£16	12	6
Leaving clear profit, for little more than six months				£23	11	6

The *quantity* of arable land necessary to the keep of a cow all the year round, will necessarily depend upon its *quality;* but, if useful land, it may be taken at one statute acre and a half. If not in condition, it will require deep trenching; if light land, claying and well manuring; but, once in a good fertile state, it may be readily kept so, requiring only a very small amount of extraneous food to be given to the cattle. The cropping that should be adopted, to attain the largest amount of food, is, first to sow the land with rye, clover, winter tares, and Italian ryegrass. In favourable localities, the rye will be fit to cut in February. It is supposed that all the crops are to be soiled—

that is, consumed in the stall. As soon as the rye is off, the land must be digged, and planted with potatoes, cabbages being inserted between the rows, and beans planted between the potatoes. The Italian ryegrass is next soiled; and, after each cutting, the land must be well saturated with liquid manure brought from the cow-house. When this is once cut down, the winter tares may be eaten off, and the land dug for turnips—swedes for the spring, and white Norfolk for the winter; or, if near the sea, mangel-wurzel will be the most advisable crop. The clover and Italian ryegrass will then alternate with each other, taking care that the latter is always dressed with liquid manure; for it has not the same effect on the clover. The bean-straw may be chopped, and the beans crushed; and thus a great amount of green food, both large in quantity and valuable in quality, will be afforded all the year round.

Where the amateur has *grass land* only, it will be necessary to set apart a portion for meadow, and the rest for soiling. The latter should have a dressing prepared of road-scrapings, clay, and decayed vegetable matter, applied in February with a pretty liberal hand; the whole of this compost being well saturated, under cover, with liquid manure. In addition, there should be applied two hundredweight of guano per acre; and either along with it, or soon after, there should be brushed in, half-a-peck per acre of Italian ryegrass seed. When ready for cutting, this should be mixed with hay, a mixture of boiled ground linseed and bean or barley-meal poured upon it, in the proportion of one pound of the former and two pounds of the latter to the gallon: the grass, after every cutting, to be dressed with the liquid manure. Three, and in favourable years four, cuttings may be easily made. When the hay has been mown and made in the lap-cock fashion, the land should have a dressing of liquid manure, and the fog soiled the same as the grass. When the season is unfavourable, or the grass deficient, the linseed compound may be resorted to. In winter, cut hay, given with linseed compound, varied by occasional meals of brewers' grains, will be found invaluable substitutes. Green food may then be given from March till November, and hay for the rest of the period, mixed with linseed compound, in which case roots so difficult to obtain by the suburban amateur, may be dispensed with altogether.

The *cow-house* should be as airy as possible, and if with weather-boarding facing the south and west, so much the better. The floor may be boarded or flagged, with a slope from the head of the animal to the tail, a channel behind, and a drain into a tank, of the capacity of one hundred gallons per cow, well coated inside with Roman cement. The whole should be kept whitewashed and perfectly clean, and free from all disagreeable smells. Where the floor is boarded, the litter, so often difficult to obtain, may be dispensed with; but if the floor is flagged with stone, or indeed in any case, it is desirable to litter the cow with an ample supply of *sawdust*. The fragrant freshness of the wood, the soft bed it makes, the absorbent character of the material, and, above all, the facility it affords as a vehicle for conveying away the solid manure, render it exceedingly valuable as a litter for cows. Moreover, it is as easily obtained as it is almost invariably overlooked. The cows should be regularly fed and well curried, and, if possible, turned out daily in fine weather, for two hours per day, for open-air exercise. The cottager, at the expense of very little labour and ingenuity, may construct for himself a very excellent cow-house of whins and thatch.

The *dairy* should be quite apart from the house; and, however small its dimensions, it should be strictly kept for dairy purposes. No cooking, nor decayed meat, nor any offensive processes, should be allowed within its precincts, but only such as are connected with the management of the milk. It should face the north, and admit of free ventilation. It ought to be a little sunk in the ground, with a sloping floor, and have a pipe carried into it in connection with the pump, and also a drain running out. In hot weather, the water from the pump should be allowed to trickle on the floor. At any rate, daily washing should be scrupulously attended to. *Glass milk-pans* are neat and elegant vehicles for holding the milk, and easily removed. Any want of cleanliness in them is readily detected. The amateur should also have a pipe from the boiler of the kitchen fire, into which, at pleasure, he can allow the hot water to flow. This pipe should be carried under the table on which the milk-pans are placed; and in the severe frosts of winter, it will be useful in keeping up the requisite temperature.

The *dairy operations* of the small cow-keeper, whether for livelihood or pleasure, are necessarily on a small scale, and do not admit of many appliances. Attention to cleanliness is, above all things, requisite. The main points are, the thorough *scalding* of the milk-pans, the pails, and the whole of the dairy utensils; the proper cooling and stirring of the milk in summer, when first brought into the dairy, until the whole of the foam generated in milking has subsided; the careful "siling," or straining, of the milk through a gauze or wire sieve; and the creaming of the milk before it is allowed to turn sour in the slightest degree. The cream, when collected, must be frequently stirred, especially in summer, and in winter warmed before the fire all night previous to the operation of *churning*. This, for small cow-keepers, may be performed either with the ordinary stand-churn, or with the American churn, now common in most parts of the country, and which is very suitable for churning small quantities of butter.

It is needless to recapitulate the directions as to the *management of cream and butter*, because there is no difference between the mode of regulation required for a dairy with one cow or with twenty. Care, attention, early rising, good ventilation, and cleanliness even to fastidiousness, are the cardinal virtues of dairy management.

CHAPTER VI.

FEEDING OF DAIRY COWS, AND REARING OF CALVES.

THE main points in the controversy, as to whether dairy cows should in summer be house-fed on cut grass, or pasture-fed, have been already partly considered. But it is still an unsettled question, because the advocates of one system are unwilling to concede to the other. The truth is that each system has its peculiar advantages in peculiar situations. The elements of cost of land and labour, of nearness to and distance from a large town, of the nature of the grass or herbage, of the conveniences of the occupier, and fifty other considerations, will make the scale of profit preponderate one way or the other. In large towns, for instance, where land is dear and at a distance from the dairy, it is found to be more economical to cart the materials of food to the cattle. For small cottiers, also, who have but a small quantity of land (and this perhaps dear, and their labour of little value), soiling or summer-feeding in the house will be abundantly preferable. But in the majority of strictly dairy farms, where there is a large range of poor pasture, the grass of which would hardly repay the cost of cutting and carting, there can be no question whatever that there must be a complete revolution in the nature of the occupation, and of the character of the soil itself, before any change can ever be expected to take place.

It is a very important question, however, whether the *two systems* may not be *combined*, with profit. We mean that, instead of allotting an acre or an acre and a half of land to a milking cow, two-thirds of that quantity should be provided; and here she should roam at liberty, with plenty of running water, if possible, and either large shady trees, or an ample shade for shelter; while, at each milking-time, she should be supplied with a bundle of tares or clover, of sainfoin or lucerne. Under this treatment she will be found amply to repay the trouble. The principal danger of house-feeding would be obviated. This danger is, that either too much food is given to the cow, and thus nausea and waste occasioned; or the cow does not get it in that clean and sweet condition which might be wished, while she is also deficient in air and exercise; but, with the treatment we have recommended, with a foddering of green food fresh mown, and with her roam in the pasture, she has all the advantages of hand-feeding, without any of its objections. She can eke out her meal in her pasture; she has it clean, and has also plenty of air and exercise; while she can consult her own will as to the amount of rest or shelter she takes, in hot or rainy weather.

So much for summer management. In winter, it is quite another matter. Some are pinched and starved; others have the cold straw-fold in winter, and are exposed to every blast of heaven. Some have more or less hay or turnips; while others are watched and tended with the most assiduous care. The first is the most costly system.

A writer in the *Cyclopædia of Agriculture* gives an account of the cost of producing a gallon of milk, according to the different modes, which is very instructive; and, though it may be a somewhat vague instance which he gives, it so nearly approximates to the spirit of truth, that we cannot avoid quoting it.

The Gloucestershire system, where the cows are fed on grass and hay, and sold lean when unfit for dairy purposes, involves a cost per gallon of milk of 6⅛d. The Cheshire system, in which a few turnips are added in the winter keep, costs 6½d. The Fifeshire system, of grass pasture in summer, and nine tons and a-half of turnips in the winter, with oat-straw, amounts to 3⅞d.; and Mr. Young's plan, in the same county, with a more liberal allowance of extra food, as bean-meal, linseed, &c., costs 5⅝d. Now, though we might have expected a greater difference in the last two cases, and in favour of the very last in preference to the former, we still see that it is the dearest way of all to starve the cows; and that a moderate degree of attention and care is necessary to the most economical produce of the milk cow, whether it be in milk or butter. When the pastures begin to fail, it is usual to turn the cow upon the fog or aftermath—say in the month of October—for nearly all cowkeepers have, of necessity, a quantity of grass land producing hay; and the after-eatage of this land affords the best possible food for the milk cow, whether butter or cheese be the object sought by the dairyman. When this runs short, a little "hand meat"—a few turnip-tops, or rape, or even a little bran-mash—will be well bestowed; for if the milk does go down at this period, it is never regained in winter by any care which can be exercised. If town milk is the object, a few brewers' grains would be the most advisable addition to the eatage which could be made. If the weather should still be open and favourable, the pasture, freed in October, will have grown up a little, and will afford a very useful turn-out for the cow; for she must usually be housed at night, when the fog is finished. In the house, she should either have hay and mangel-wurzel or turnips; or, if she has straw, she should have cooked linseed, or oat or bean-meal mash. The mode of cooking linseed we shall fully discuss in the chapter on cattle-feeding; but for small farmers, without apparatus, a very cheap and extempore mode may be pursued without difficulty. The chaff of the barn, after winnowing, may be collected, as free from dust as possible; or, if mixed therewith, it may be sifted and laid by. A bushel of linseed may be added to two bushels of barley or oats, or even wheat, or any other grain, grown in the ordinary way. This may be boiled in a common boiler, taking care to keep it well stirred, to prevent its "setting on" at the bottom of the boiler. After boiling a quarter of an hour, if this be poured upon the chaff in the proportion of one-and-a-half to two pounds of the meal, and a gallon of water to one bushel of chaff, one of the most useful and certainly the cheapest adjuncts to milk-cow and store-stock feeding will be adopted which can be conceived.

The great objection to turnips, at least in large quantities, is the flavour they impart to the milk and the butter. This is a difficulty which can only be partially got over. It is surprising, however, how few turnips or roots will be required, if the compound system be adopted; and this quantity being so small, it is easy to vary them, by giving potatoes, carrots, mangel-wurzel, &c., in an ever-changing round.

It is a question whether hay need ever be given, if the compound system be adopted. If it be not, the cows must have a liberal allowance of hay. In Norfolk, oats, barley, or bean-meal, is mixed with chopped hay. It is questionable, however, whether the cow has not more gratification, and hence more advantage, from selecting and masticating the hay alone, than can be derived from the cutting and mixture, which at least is a costly and laborious process. A small quantity and a great variety of food will, on the whole, produce the most favourable effect on milk cows.

The Rev. Robert Pulleine, of Kirby Wiske, in a Prize Essay of the Yorkshire Agricultural Society, thus describes his very successful method of keeping dairy-cows in winter:—

"In the management of dairy-cows during the winter season, it is of the greatest importance to have a dry, well-ventilated cow-house. The side walls should not be less than seven feet in height; and in the two courses immediately below the top course, every alternate brick should be left out to insure a sufficient ventilation. A rough board on a couple of hinges may be fitted to close the openings, in case of very severe weather; but I have never required it.

"The floor on which the cows stand should be made of well-beaten soil, and behind them a kerbstone about three inches thick and twelve inches wide, to raise them above the channel, which should have a slight fall, to carry off the water at once.

"My cows are tied up in pairs; each pair having a space of eight feet by six feet six inches, which is sufficient room for any beasts under sixty stone weight. They have a crib before them, nine inches deep by twenty inches wide, raised upon twelve inches of brickwork. The advantage of the crib being raised is, that the cows are less liable to get turnips into their throats than when they have to put their heads down to the ground for their food. A rack I consider of little moment, as the hay is all given as chop.

"It is a good plan to take up cows as soon as the nights become cold, say the middle of October, as the white frosts which occur about that time cause them to run off their milk. They are turned out during the day until the middle of November, if the weather keep fine. From that period until May-day they are kept entirely in the house, except being turned out a few minutes every afternoon to water. They are milked at half-past five o'clock, morning and evening. As soon as the man who feeds them comes in the morning, the dung is all removed, and each cow has a feed of 28 lb. of roots:—

"At 7 o'clock......... 7 lbs. chopped hay.
" 9 " .... A pail of water, with ½ lb. of bean-meal stirred into it.
" 10 " .... 2 lbs. of linseed-cake.
" 1 " (P. M.) 7 lbs. chopped hay.
" 2 " " ... Turned out to water, and then 2 lbs. of linseed cake.
" 5 " " ...28 lbs. roots.
" 8 " " ... 7 lbs. chopped hay."

Cleanliness is the first requisite in a successful dairy cow-house. The place must be kept free from smells of all kinds, and should be frequently washed and whitewashed, and the animals diligently rubbed, and even curried. A thriving cow out of doors is known by her having the marks of her tongue upon her skin. If she is not at liberty to lick her own skin, she should at least have it done for her. Her litter should be taken away the first thing in the morning, and fresh clean straw given in its place. Above all, she cannot have too much air, if the cold blast be just shielded off. Bad as is exposure, the crowding of cows in close places is considerably more so. There should be free currents of air. Ventilators at the top of the cow-house in the louvre style, open fronts to the south, capable of shutting up in snow or southern rain, and capacious ventilators at the bottom by grates or ventilating bricks, are indispensable to the health of the cows. If these be neglected there can be no hope of health in the cows, or success in the dairy.

The *influence of the food* on the quantity and character of the milk is a question on which there has been a great deal of speculation. A very scientific agriculturist, Mr. H. Briggs, of Overton, furnished the writer with an experiment showing that the increase of milk, within certain limits, was almost in the power of the farmer, by an addition of bean-meal to the ordinary root foot and hay. Although, as a general rule, milk may be produced by these costly and stimulative kinds of food at too great an expense, yet it is of great importance in a particular season, or under special circumstances, to know the means of increasing the supply of milk beyond the ordinary quantity.

The researches of the Professors Thomson are well known. They selected two Ayrshire cows, and fed them with malt in various combinations. They found that 100 lbs. of barley, hay, and grass produced 8·17 lbs. of milk; and that the same quantity of malt and hay produced 7·95 lbs. of milk; the former yielding 1·95 lbs. of butter, and the latter 1·92. Now, though this was not at all satisfactory as to the value or otherwise of malt for milk cows—a proposition never perhaps before seriously entertained—still it shows how food may influence the quantity and quality of the milk.

Messrs. Dumas and Boussingault tried a number of very careful and interesting experiments on the quantity of milk and its products which would be given by cows fed on different kinds of food. They tried nearly all the combinations usually given, except, perhaps, bean-meal; and the result was, that the greatest quantity of milk was produced in every case when the cow had green clover; thus proving that, in each instance, this yielded the greatest quantity of butter, and, with one exception, the greatest produce also of cheese; and that exception was when the cow had been but one day calved, which would account for the abundance of cheesy matter in the milk. The table is so instructive, that we shall quote one or two of the items:—

Food.	Days after calving.	Milk.	Butter.	Cheese.
Potatoes and hay	176	9·3	4·8	3·3
Hay and green clover	182	8·9	4·5	4·0
Green clover	193	9·8	2·2	4·0
Clover in flower	204	7·8	3·5	3·7
Potatoes	229	5·0	4·0	3·4
Turnips	207	6·0	4·2	3·0
Red beet	215	5·6	4·0	3·4

We shall not here enter into the philosophical investigations and reasonings of these experimentalists; but merely add that mangel wurzel, bean meal, and grains largely contribute to the increase of milk; that good hay and oat mash augment the quantity of butter; and that turnips, though they sometimes impart a disagreeable flavour, materially add to the increase of both.

The result of Mr. Pulleine's system of management, in the production of milk, given in p. 101, is as follows; the cows being five in number, viz:—

1. Yorkshire, 9 years old, had her last calf March, 1850.
2. Alderney, 2½ years old, calved July, 1850.
3. Yorkshire, 2½ years old, calved November, 1850.
4. Yorkshire, 5 years old, calved January, 1851.
5. Ayrshire, 6 years old, calved March, 1851.

He says, "It will be observed that No. 1 and 2 can hardly be called in full milk, and No. 3 is only a quey. They produced in the seven weeks, from the 25th of March to the 10th of May, 191 rolls of butter 24 oz. to the roll, equal to about 254 lbs. 16 oz. to the pound. To this must be added 154 quarts of new milk and 42 quarts of cream, consumed in the house. The milk was not regularly measured, but averaged about 60 quarts per day."

To keep the cow as *long as possible in milk* is sometimes an object. Some cows dry early; some may be milked through, though always with disadvantage to both the cow and her calf; both being feeble and impaired, if it is persisted in. In summer weather, however, when cows are very deep milkers, and in high condition, it is not only sometimes advisable, but absolutely necessary. A cow not put to the bull will hold her milk much longer than one which is regularly breeding.

The *spaying* of milk cows is adopted by the veterinary schools of France, and a great deal is said in its favour by the Academy of Rheims and other authorities. A report on the subject was furnished to the Academy by M. P. Charlier, which spoke almost exclusively in its favour. The practice is an old one in Germany and England. The object is supposed to be to increase the feeding propensities of the animals, but by no means for the purpose to which we refer, and which mainly occupies the attention of the French veterinary school, viz., the prolonging of the period of lactation. The report, which is very voluminous, states a variety of experiments made on cows, old and young—some as far advanced in age as eighteen years; but, in order to realize all the promised advantages, the cow is said to be best from four to eight years of age. The operation is performed on the right side, and does not altogether occupy more than from four to ten minutes. It is seldom fatal, unless the cow is in calf. In some instances the cows are said to go and feed as usual, even after the operation.

The conclusions from the above report, endorsed by the reward of the society's medal, were—that *spaying* increases the supply of milk from the animal after a few days; that there is a steady return of milk of the best quality, less liability to fall off milk, and no troublesome tendency to desire the bull; that in eighteen months the milk does not diminish; that the feeding tendencies of the cow are much increased, and the quality of the beef improved. Nay, it is further said, that in one dairy (the number of the cows not being given) a difference between spayed and unspayed cows in milk was 850 pints per annum;—no great quantity, however, if it were a considerable dairy, and where possibly the best cows were spayed.

There is, we must confess, a barbarity about this practice (needless, we believe,) which makes our kinder feelings revolt at an operation performed for so little advantage, over the gentle, patient, harmless milk cow.

REARING OF CALVES.

This is a process more or less belonging to every dairy-farm. Though every cow does not annually produce a calf, still heifers are usually put to the bull at two years old, and the period of gestation varies from 275 to 290 days. Thus the old-fashioned mode of reckoning three months back in the almanac, is by no means a difficult way of ascertaining the date at which a cow put to the bull may be expected to calve. She is nearly three years old before she produces her first calf.

It too generally happens that little skill or care is used in selecting a male animal. A neighbour has a bull, and that is enough. A farmer may have no opinion of the neighbour's skill or judgment. He asks nothing about the breed or the blood. He may see him, or he may not. It is no wonder that such brutes of animals are produced. Encouragement is given to a careless indolent selection of male animals, and bad breeds of cattle are extended and perpetuated.

Five or six weeks after calving the cow will again be disposed to take the bull, but it does not happen that she always holds; and if the month of June passes before she is bulled, she calves at a period of far less value to the breeder. In some cases a tithe only of the dairyman's cows are in calf. He loses both produce and milk; for, whether in calf or excitement every twenty-one days, it produces a most unfavourable influence on the milk of the cow and that of her companions. There are a variety of remedies suggested for this sad defect. Bleeding, confinement, and abstinence at the period of bulling, and omitting to carry the animal to the bull for one return of the season, are amongst the most likely resources of the breeder. Some adopt the plan of throwing a pailful of cold water over the loins after the cow has been served, which, it is alleged, gives contractibility and tone to the system. It can do no harm. Sometimes a change of bull is advantageous. It is also desirable to send them in the morning before milking.

But sometimes the reverse is the case. The cow *refuses to come in season*. For this difficulty various panaceas are proposed, the most reasonable of which is the giving the animal a quart of the milk of a cow in season. At the end of three weeks, it is alleged, she will take the bull; and a second return will be a fruitful conception. We state this as an axiom of old dairymen. It deserves record as an opinion, for we never saw it in print; and, therefore, we leave it for future experimentalists to settle.

To bring up a calf for the butcher is the easiest thing possible. They have only to suck the mother for the requisite number of weeks, till they are of size and fatness required for the taste of the consumer or the judgment of the buyer. But to rear calves for store purposes is a different affair. Breeding farmers have to bring up perhaps eight or ten calves with only four cows. They buy them in the market.

They must necessarily nurture them on artificial food; and it is their business to feed them, in order to bring them to a favourable state of growth and maturity, on such substitutes for milk as shall be the least expensive and most efficient. Their own calves are more easily brought up.

The materials usually employed are, new milk, skimmed milk, meal-porridge, linseed-tea, and (for solid food) hay, grass, turnips, meal, potatoes, mangel wurzel, &c. Some breeders—whose object is the calf, and the calf alone—sacrifice every other consideration to this. The breeders of shorthorns, whose early maturity require a corresponding early supply of nutritious food, generally apply Nature's own provision, and allow the calves to suck either their mother or some other dam, or in some cases more than one cow, in order that they may develope their precocious and distinctive qualities. This practice they often continue for six or twelve months. It is, however, an expensive mode of feeding for those who rear only ordinary cattle for the market. Moreover, some are so "stingy," that as soon as the cow ceases to give "beestings," they begin to give the calves skimmed milk. A process of this kind does irreparable injury to the young animal.

The best mode, with ordinary calves, is to give new milk for at least fourteen days after the calving. There are two modes of doing this: either to allow them to suck the dam, or to remove them as soon as calved, but train them to drink in the first instance. For ourselves, we think that taking away the calf is both cruel and unnatural. The healthiness of the mother, we consider, depends upon it. After calving, it is only necessary to see the anxiety and care for her offspring, which makes her forget all her pain, and diverts her attention from her sufferings; whereas, if you subject her to the gloomy excitement of losing it, it is no wonder that milk fever and inflammation so often supervene. We invariably allow the presence of the calf for at least a fortnight. We suffer the mother to lick over the whole of her offspring, because we think that a privation of this medicine of Nature is a cause of many a valuable animal being lost. After the first fourteen days we mix one-half new and one-half skimmed milk for fourteen days more; this skimmed milk is scalded nearly to the boiling point, set aside to cool, and given to the animal. One great secret in the successful rearing of calves is to give them frequently small quantities of food at a time. For the first fortnight it ought to be fed at the very least four times per day. About a quart at a time will be necessary; which quantity may be increased afterwards, as the animal's wants may require it. Soon after this the skim-milk time commences, when the animal, if properly trained, will begin to eat the solid food.

Teaching them to eat is a matter less difficult than that of training them to drink. Nature presents to them, first a sucking, then a drinking process. In training them to drink, it is generally necessary to use the finger, which, while dipped in milk, is introduced into the mouth of the calf. The young animal then sucks the finger, and thus imbibes the milk. By and by the finger is withdrawn, and the calf drinks alone, and unassisted. The eating process is somewhat differently taught. A piece of fine hay is tied together with a string, and suspended in the calf-crib. The calf begins to suck this bunch of hay; and part of it coming out from the string, the calf is gradually taught to eat.

Some parties tie up the calves by the neck in stalls and other places. Others keep them loose in houses. We prefer the latter course. The exercise the animals take is beneficial to their health; and, on the whole, we much prefer this partial freedom.

The supply of milk, however, on most farms is limited. If the farm is not confined to dairying purposes, the milk cannot be spared; and if new milk cheese is made, it is equally in request. Hence *substitutes for milk* have necessarily to be adopted. Hay-tea is one of the substitutes sometimes used for milk. We think it generally a poor one. If it has been made from hay grown on very rich alluvial soils, so much the better; but there is every probability that the bitter extract may, with the colour, deceive, and lead to the belief that it is more nutritious than it really is. Take good meadow hay, and deduct 44 per cent. for woody fibre and for saline matter, which varies from 5 to 10 per cent. (most of it being held by the organization of the plant); and about 50 per cent. of starch, sugar, gum, gluten, albumen, legumen, and fatty matter remains in the tea. Many parties make a point of boiling the hay, but we do not consider that there are any great advantages derived from the practice. Mr. Parkinson's plan is about the best with which we are acquainted. His tea is made by placing in a tub a quantity of good hay—such as has a sweat in the stack, is of a brownish colour, and feels clammy like tobacco—then pouring boiling water upon it, and covering it up, to keep in the steam. This infusion ought to be prepared twelve hours before using, when the milk, being boiled, should be added till the mixture is reduced to a proper heat.

We believe that food for calves may be prepared of a much more nutritious nature, and with more probability of advantage to the producers. We shall, therefore, proceed to enumerate the various kinds of food on which we have successfully reared calves for several years past.

1. *Wheatmeal Porridge.*—This is made in the following manner :—Boil two gallons of water, and mix a pint of fine flour with cold water, sufficient to make it into the consistency of a thick cream. This should be thoroughly mixed, and put into a bowl capable of holding half a gallon. A small quantity of the hot water is added to the mixture, and stirred so as gradually to raise the temperature of the flour and water in the bowl, and prevent it from running into lumps. This is plunged into boiling water, and stirred until the whole boils again. It thus coagulates the mass, and forms a thick nutritious porridge. It is a great improvement to the mixture if one-sixth part of old skimmed milk is mixed with it, which not only gets scalded itself, but very materially improves it. Two gallons of the mixture per day will be found sufficient.

2. *Linseed Jelly*, combined with the milk, is a very valuable auxiliary. We ourselves have scarcely tried the seed by itself sufficiently to be able to give a very decided opinion upon it. We much prefer the pressed seed, in the shape of cake, crushed to a powder; and for this reason, if we wanted to lay on fat, we should give them the crushed seed, because its fatty matter would, when cooked, be easily assimilated into animal fat; but when bone and muscle are to be formed, every pound of fattening matter in the food displaces other substances calculated to build up the animal structure. For this reason we most approve of the jelly produced by the crushed cake. The proportions of this cake to the water should be as follow :—To two gallons of water take two pounds of oilcake, bruised or crushed nearly to a powder; sprinkle it in the water, stir, and allow it to boil ten minutes. Cool with skim-milk, if convenient. A rich jelly-like mass of the most nourishing kind is produced, which should be given in a lukewarm state.

3. *Broth Porridge.*—This appears an unnatural mixture; but it is often used very successfully, combined with other mixtures, for feeding calves. The water in which bacon has been boiled is carefully preserved, and diluted with perhaps one-half of its quantity in water. It may be expected that a substance like bacon, from which nitrogenized and phosphoric matter may be expected to be dissolved by the action of boiling, will be of use; but to make it alimentary it is necessary to mix it with a considerable proportion of milk. However unnatural

this mixture may appear, and however contrary to all theories of natural history it may seem to give carnivorous matter to herbivorous animals, still we may find an analogy by no means unimportant in the disposition evinced by mature animals of this description to select and chew for hours together a piece of bone, which they will search for with instinctive pertinacity, and relinquish with reluctance. Is it not because the animal finds in it nitrogen or the phosphates denied her in the food upon which she is confined? If this be so—if she is guided by her instinct to select and choose animal matter—why may not a decoction of animal substance be useful to the calves in their younger stages as an auxiliary, and, to a certain extent, a substitute for the beverage which Nature has given them, but which man denies them?

Solid food for calves will soon, however, displace much of the liquid. At five or six weeks old they ought to be trained to eat sliced roots. To do this it is only necessary to supply them, in convenient forms, in a trough within their reach. Their moments of leisure will be employed in playing with and sucking those pieces until they begin to masticate them. The roots should, for this purpose, be cut into oblong pieces, one inch broad, half an inch deep, and two inches long. These shapes being more adapted to their conformation, and better calculated to make them learn to eat of their own accord, are better than either slices or squares. Calves should be reared from the month of September to March. We do not approve of late-bred calves. If they are reared late they become tender, and require nursing the following winter. In the months we have named, however, turnips are always plentiful; or, if mangel wurzel is cultivated, it will be found a very successful substitute; although we prefer swedes. These appear not only to agree with the palate of the animal, and to make it thrive, but they exercise a very beneficial influence on its subsequent development. Is it because they contain a large share of the phosphates? Sprengel makes the relative proportions of the phosphates in the swede to be nearly six times as great as in the common turnips, and sulphate ten times.

	Phos. Acid.	Sulph. Acid.	
Common turnips	73	41	per 1,000lbs.
Swedes	408	890	

Other auxiliaries are sometimes adopted, such as bean-meal, pea-meal, oatmeal, cattle sago, and Indian meal; all these being very material aids in rearing calves. It not unfrequently happens, however, that some peculiar root or grain may be purchased at a much cheaper rate than any product of the farm can be grown.

Great discussions have taken place as to the mode of feeding calves adopted by Mr. Huxtable. He proposes to accomplish it at a cost very different from any other breeder. We should fail in our duty if we did not give his plan, and also the cost as it really occurs in Scotland.

MR. HUXTABLE'S PLAN.

	£	s.	d.	£	s.	d.
First month :—						
Two quarts of new milk daily, at 1½d. per quart, for each week	0	1	9			
Six quarts of skim milk daily	0	1	3½			
	0	3	0¾			
			4			
				0	12	3
Second month :—						
One quart of new milk daily	0	0	10½			
Five quarts of skim milk	0	1	1¼			
Half a pound of oilcake	0	0	8			
	0	2	7¾			
			4			
				0	10	7
Subsequent cost, viz. :—						
From third to twelfth month 150℔ of cake, at £7 per ton				2	15	0
During last six months of second year 2℔ of bean-meal daily				1	2	0
Attendance for two years				1	14	10
Calf born on farm, price if then sold				0	9	0
Total				£7	3	8

MR. NICHOLSON'S PLAN (SCOTLAND).

	£	s.	d.
Forty-five days' milk four quarts, at 1½d.	1	2	6
Mixed gruel—wheat and linseed, four quarts, at 0½d.	0	7	6
Carry forward	£1	10	0

	£	s.	d.
Brought forward	1	10	0
Forty-five days of the same mixture in double quantity	0	15	0
Hay, cake, and turnips, at 1d.*	0	3	9
Grass from June 1 to October 15, at 10d. per week	0	15	10
Second summer's grass	2	0	0
Ninety days' oilcake, 3lb daily, at £7 per ton	0	16	8
Price of calf, if bought	1	10	0
Loss from death, at 10 per cent., on £6 13s. 7d.	0	13	0
Attendance for two years	1	0	0
Total cost	£9	4	3

The *degree of confinement* to which a young and growing animal ought to be subjected is an important consideration. The close confinement of a Highland kyloe would give him the rickets and disease. But a shorthorn will bear confinement and thrive better with it than with excessive liberty. We do not approve of tying an animal constantly by the head when very young. It is in opposition to natural and healthy exercise, and renders the animal unfit for the purposes of life. The writer, who has fattened animals at eighteen months and two years old, which are necessarily very much confined, has had young animals whose bone was too supple to carry the heavy body, and their legs have literally broken while taking them away to the slaughter-house. But absolute confinement in the case of calves is much worse. It prevents their growth and healthy development, and is the parent of many diseases.

Cleanliness, above all, should not be neglected either in the food or the litter, or in the calf itself. If food too hot is given, the calf will be surfeited, and lose its health and hair; if too cold, it will be starved, and liable to disease; if sour, it will have shoot or scour; and if strongly fermenting dung be allowed to accumulate where it is kept, it will, ten to one, become disordered in its bowels, a disease which, when once begun, will go through the whole pen of calves, unless the one attacked is at once removed. In this case whitewashing the house and stall daily will be necessary, and plenty of

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* During the first winter, 210 days, 6½ tons of turnips would be consumed, at the rate of 70lbs. per day, and in the second winter, 215 days, 17½ tons, at the rate of 182lbs. daily. The cost would be less if the calves were both reckoned at the same price.

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fresh air should be afforded. Quicklime scattered on the floor will be beneficial.

To avoid all these evils, loose confinement in stalls, with the front fastened up (which enables them to walk about without escaping, and allows them company without actual contact), is by far the best plan. The open causeway before the stalls will afford them plenty of air and light, while their constant trampling will keep the manure beneath them from fermenting. They will then only require to be well littered, for it will starve them to be too frequently cleaned out in winter. They will have at all times a warm bed below, with plenty of air above; and the litter will be so consolidated as never to putrefy to any objectionable or inconvenient extent.

In feeding stock the worst policy of all is to stint the calf of food in its early stages. That calf may be said to be always fat which never loses its first layer; and as the difference is often a question, in after-fattening, of some six months' keep, there can be no question that it is of the greatest importance to keep it well at first.

Giving the calf that food which is easy of digestion and suited to its feeble stomach in early life—allowing it especially its mother's milk, the beestings and the soothing influence of its mother's tongue—weaning it from new milk gradually and cautiously with a plentiful allowance of good sweet hay, are the real elements of success in calf-breeding. This course, with a proper attention to air, warmth, exercise, and cleanliness, is all that is required in the proper management of young calves.

CHAPTER VII.

CATTLE-FEEDING.

It might be supposed that in a pastoral country like this, where *fat* has ceased to be a luxury at the tables of the great, and has become a necessary of life to the mass of the population, that all the modes of fattening cattle would be so well known, that a tyro might be able to describe them. But they are only beginning to be investigated in their main element. Everybody knows that rich alluvial pasturage, that linseedcake and Swede turnips, that combinations of hay and bean-meal and ground corn, with a dozen kinds of roots, will feed cattle sooner or later. But the question now is simply one of *economy*—*How can the greatest number of pounds of beef be produced at the* *least possible cost?* This is the real question still unsettled; and on this we will proceed to show the extent of our present knowledge.

First, the grazier must select such animals as will lay on fat rapidly; and, by a physiological law, as we have seen, there are those which will soonest attain maturity, so as to be fit for feeding. We stop not now to examine whether or not the two principles of taking on fat early, as well as rapidly, are necessarily connected—though it is very probable they are—and that a tendency to lay on fat will show itself at a very early period of the animal's history; though it may possibly be a mere result of the breeder's skill to obtain the two qualities combined.

Now, every good grazier knows an animal that will *thrive*, that being a simple matter of judgment. A skilful man will select out of a drove five, or ten, or twenty animals, and nineteen of the twenty will be the best graziers for his particular farm. The eye guides him partially, as well as the signs we have described in the chapter on the breeds of cattle; but, more than all, he is directed by the *touch*.

After selecting the animal, the mode of feeding him is to turn him out into a grass field skirting a river (if such be within the grazier's power), where the alluvium of ages has been washed into the soil so deep that the roots of the herbage cannot find its bottom, and so firmly comminuted as to admit of the minutest filaments of the radicles of the plants to penetrate it with facility; so porous as to admit the air to enter, and the water to filter gently through; and altogether retaining its elements in a state of solution so delicate that they are ready for food to the plants which consume them; and lastly, though of greater importance than all, having the elements of vegetation in abundance. Now all men know that on such a soil, in five, six, or even in four months, a lean animal will become fat. He has all he requires. A little attention, to see that he is *well*, is all that is required from the time of his being placed in the pasture to his being taken to the butcher. There is neither labour, nor pains, nor expense incurred. He is worth five pounds more when he is taken out than when he was put in, and that is all the grazier knows or cares for. Now we shall find out the requisites here for feeding strictly laid down. There is plenty of fresh and highly nutritive food; there is scarcely any labour in searching for and obtaining it; with water, and shelter, and warmth, and also plenty of air, and freedom from constraint. This is what the feeder must aim at, in his winter-fed cattle. They cannot feed in the open air; the cold and wet would starve off the flesh as fast as the food laid it on. Here he must provide *shelter*.

Now, one of the controversies of cattle-feeding in winter is, which is the best mode of effecting it? The Scotch farmer loudly contends for full and perfect liberty to the animal. If he is too warm, he will sweat; and if too closely confined, he will fret and murmur. And he declares that practice has decided that they should be fatted in open hemmels. A sheltered shed they may have, but nothing beyond it. The midland-counties man says this exposure is dreadful. It wastes their beef and renders them subject to disease, and involves long feeding. Another class again insists on the tying-up of the animals as injurious to their health; that a little exercise, but absolute confinement, are equally necessary; and that they should have shelter, with freedom.

These two classes are controverting the merits of box and stall feeding; and both of them may be right. Take a Highland Scot; consider his wild habits, his long stray of mountain and glen, his wide-spread pasture of peat and heather, from which he could in his native fastness smell afar off his friend or his enemy—man! Tie him by the head, and he becomes fretful or furious—he will pine, and fret, and worry himself; while in his gregarious state, with a herd of his fellows in open yards or hemmels, he will thrive. Nay, he has a nature which will lay on fat despite the cold and wet: as the rye among plants can assimilate food from the barrenest soil, so he has a natural shelter in his hair and constitution, for which the owner of more delicate and tender animals will not give him credit. He forgets that the Scotchman has a different animal to deal with, in his hemmel-feeding, from the delicate southern shorthorn.

The shorthorn feeder, on the contrary, possesses a tame, quiet, gentle, lethargic animal, which shows that universal mark of good breeding in men and animals—he is always *quiet*. He will neither pine at never beholding the light, nor feel the want of exercise if he never leaves his stall, provided he has food and comfort in plenty—nay, he will hardly take the exercise necessary to keep his limbs in healthy action. But we should keep him from the cold and wet, and prevent the blast from passing over him, or otherwise he will wither like a summer flower; he needs protection, and thrives best in boxes.

Take a Devon, or, if you like, a Sussex ox. He is large and cumbrous, but he is active. Give him liberty, and he will roam and harass himself; but he is tame enough to keep to his stall without pain or fretting. He requires a stall, he needs a mild climate and shelter, and he is best confined by the head.

The *temperature* at which it is desirable to keep feeding animals is a matter of more importance than might be inferred from the little consideration bestowed upon it. A discussion took place at the Leeds meeting of the Yorkshire Agricultural Society as to the management of feeding animals. The question is, are we to run the risk of a wasting expenditure of food by perspiration under excessive heat? or are we to induce them to burn it up, to keep up animal heat, by exposure to too much cold? Nay, will not different classes of feeding animals be subject to different consequences, from the same degree of heat? In the same cow-house there may be some too hot and others too cold, from their different constitutions. Oxen generally sweat at a temperature in which heifers thrive admirably. This happens at any rate till Christmas; after which they seem to be able to bear the same degree of heat as female animals.

H. S. Thompson, Esq., to whose indefatigable and well-directed efforts farmers are much indebted, tied up two sets of feeding bullocks, —eight in a warmer shed than the rest. They had the same quantity and kind of food; but those in the warmer shed made more beef than those in the colder; thus showing that warm air, as well as warm food, was highly favourable to fattening short-horns; which breed, we believe, he invariably fattens. The temperature he aims at is about 55° to 60° of Fahrenheit. An increase of this caused them to get off their food, and lose their tone and appetite.

Stillness, with the limitations given in our remarks on shelter, is necessary to successful feeding. This is well known to geese feeders, who even nail them to the boards. The fact was shown very strikingly by Mr. Childers, M.P., in his experiments on shed-feeding, and by Lord Bathurst, in stall-feeding sheep. An animal, in the very effort of searching and securing his food, expends the principle necessary to make him fat; hence it is necessary that his turnips be brought to him, instead of driving him to the turnips. They are cut and placed before him, that he may have as little effort as possible in the operation of chewing; and he should have ample allowance of room, so that when he is fed he may lie down and sleep.

It is a question whether animals feed fastest in the *dark* or not. There can be no doubt whatever that anything which distracts their attention, which excites action, or which produces nervous irritation, is opposed to fattening; and as darkness will induce sleep, and promote quietness, it is so far favourable; but it is not so easy to have darkness and sufficiency of fresh air at the same time; and therefore the best possible state, perhaps, is to have the feeding-houses rather in a state of shady gloom than in absolute darkness. A certain amount of nervous energy is necessary to give tone to the vital powers. Beyond this, repose and quietness are easily attained by a simple gloom; while shelter from flies and heat in summer, and from blasts, wet, and extreme cold in winter, should be carefully provided.

Abundance of good food, and regularity of feeding, are essentials in all kinds of fattening. Though it is not desirable to allow the animals to have food standing before them when they are filled, they should never, on the other hand, experience a single feeling of want. The usual hours of feeding should be strictly adhered to, for the two-fold purpose of inducing regular periods of sleep, and for supplying the system with food at the first call of appetite.

Variety of food is a most essential element of rapid fattening; and it is not far from the truth to say that all kinds of food are *equally* fattening, if they are given in sufficient variety. If roots, grain, and hay be changed every few days, the appetite is never cloyed; and the whole are devoured with a relish which developes fat in the most rapid manner.

The *formation of fat* is the work of the grazier. His animals are generally full-grown, or nearly so; and though there may be a small increase of muscle, still the bulk of the material of increased weight is *fat* and not *flesh*. In this country, food to be palatable—to be consumable—must be fat. Unless it has this recommendation it is absolutely unsaleable. The appetites of the higher and the necessities of the lower classes urge on the demand for fatted beef, mutton, and pork; and any meat brought to market in a state other than fat is looked upon as carrion. The members of the operative's family have to content themselves with the vegetables and gravy, while the head of the family consumes the flesh, to enable him to perform his labour; and thus, when the fat is not available, one important source of the food of his household is dried up. Hence the grazier must supply the whole of his animals in a fat state to the consumer. Therefore it is not the number of animals, nor their weight in pounds and stones, he has to consider, but he has to provide for them the means of fattening before they can be brought to the consumer.

The saccharine matter of vegetables, and their starch, will supply the means of fuel-food. The fatty matter will produce ready-formed fat, and the albuminous matter will afford the flesh which animal waste is continually throwing into the excretory system.

It is not our intention to enter into the disputes between two great schools of physiologists, as to whether the fat is formed by transmutation of the sugar and starch of the food, or whether it consists of the ready-formed fat of the food on which the animal feed. Without for one moment pretending to settle this point, it is at any rate desirable so far to supply both saccharine and fatty matters, as shall give the system the choice of selection.

Preparation of food for the animal's stomach, or a system of cooking, is a very important question. Steaming hay, potatoes, and turnips has been tried very carefully in Scotland, and failed. For *cattle*, at least, it is useless, however valuable it may be for pigs. Yet it is certain that, with certain combinations, all that a feeder can desire is attained by the *cooking of linseed*.

The fat of animals is strictly analogous to vegetable oil. Its elements are much of the same character as sugar, starch, and gum; and no doubt is entertained, by physiologists and chemists, that the fatty matter (vegetable oil) in plants is assimilated into animal fat, with but little change. The elements of those compounds severally are :—

	Sugar.	Starch.	Gum.	Mucilage.	Animal fat (stearine).
Carbon	12	12	12	24	71
Hydrogen	11	10	10	19	69
Oxygen	11	10	10	19	7

The oil contained in many seeds is given by Professor Johnston:—

	Oil per cent.		Oil per cent.
Linseed	11 to 22 say 17	White mustard	36 to 38 say 37
Hempseed	14 „ 25 „ 19	Sweet almond	40 „ 54 „ 47
Rapeseed	40 „ 70 „ 55	Bitter do.	28 „ 46 „ 37

This would naturally indicate that any of these seeds would, so far as they were palatable, be useful; and when linseed contains as much as seven per cent. of mucilage, ten per cent. of sugar, and fifteen of soluble albumen, it is clearly indicated as being a seed most valuable for feeding and nourishing purposes. Various attempts have been made to adapt it to the feeding of cattle. There was some difficulty in grinding it by ordinary mills, as it clogged up the teeth; and when given to animals, either alone or combined with considerable quantities of corn, meal, or other feeding matter, the effect was purgative, and but few breeders persevered in the use of the seed alone. The demand for the oil, however, induced the crushing of the seeds to obtain it, and the refuse left was found to be very valuable as feeding material; while the portability of oil-cake, its cleanliness, and capability of being long kept, made it a general and desirable food, both for growing and feeding stock. The oil abstracted, the cake contains, according to the same accurate authority :—

Water	10·05
Mucilage	39·10
Albumen and gluten	22·14
Oil	11·93
Husks	9·53
Saline matter and sand	7·25

We do not see exactly how the cake can contain so large a proportion of oil relatively with the seed; but it is probable that the seed had originally contained a large proportion of oil, and that it had been but indifferently crushed. Good English-made cake, however, has been thoroughly established as one of the best fattening products; and the extensive farmers of Lincolnshire and other places expend upon a single farm, in one year, as much as £400 to £500 for this article of food. So well understood is its fertilizing character, that many landowners are willing to make themselves and their incoming tenants chargeable with proportions of the money so expended, at the rate of one-half to one-third. It is the opinion of some of the best farmers, that when cake can be purchased at the same price per ton, in pounds, that beef and mutton can be sold at per stone in shillings, it will be paid for in the cattle and animals fed, without reference to the manure. The price of cake, however, depends on no such element of calculation. The demand for it has increased far beyond that of the oil, and in some seasons it has been so great, that the former became an object of commerce rather than the latter, and realized as much as twelve guineas per ton.

Attempts have been occasionally made to render the uncrushed seed available by a cooking process; but it has been generally found more adapted for calves than for store-stock or for fattening. Where used at all for the latter purpose, it has only been to supply a deficiency in turnips, which took place in the years 1825, 1826, and 1827, in consequence of the excessive drought throughout England. In these years linseed, in various shapes, was used as a substitute.

The most decisive step, however, in the use of cooked linseed, was taken by Mr. Warnes, of Trimmingham, near North Walsham, in Norfolk, in 1841, when a discussion on feeding cattle with linseed cake was appointed by the Farmers' Club. Mr. Warnes commenced by inquiring into the nature of cake, which he found consisted of the refuse of linseed. He immediately commenced a series of experiments with linseed in various forms—both crushed, steeped, boiled, and cooked in various ways. He also tried the boiling of barley and other food on various animals. He ultimately adopted a mode of feeding, on what was called by him linseed compound. He carried out, in connection with his experiments in growing, dressing, and preparing the flax, the feeding of cattle with the prepared seed in boxes as antagonistic to tying up and the summer grazing of cattle by soiling.

In order to witness the whole of these processes, which were exciting much attention, not only in England, but in Scotland and Ireland, we paid a visit to Trimmingham. We were received by Mr. Warnes with a friendliness and hospitality which bespoke a philanthropic and well-regulated mind. He laid before us the whole of his plans with a degree of candour and openness which showed that his object was to benefit others, and not to keep his discoveries exclusively to himself.

His cooking apparatus is so simple that it is managed by a blind man, whose happy countenance bespeaks neither over-weening anxiety nor unremunerated toil. The apparatus consists of two cast-metal boilers, fixed in brick, with a fire-place beneath them. The water is made to boil before the linseed is put in. The seed is crushed by a very powerful implement, made by Messrs. Harwood, of Ipswich, consisting of two cylinders, one of them of large diameter. They are made to press upon each other in their revolutions by two lunar springs, and two men will thoroughly grind two bushels in ten minutes. At this rate the men are able to work the whole day. The mill is, however, capable of being reduced to the capacity of one man. The crushed linseed is sprinkled upon the boiling water at the rate of one gallon of seed to eight gallons of water. Great stress is laid on sprinkling the linseed very gradually; otherwise it is apt to adhere in lumps, and cleave to the sides or bottom of the boiler. With this precaution, however, Mr. Warnes assures us that he has had no instance for several years of this occurrence. This mixture is boiled six minutes, and for that period is slightly stirred. At the end of that time it is found to be a thick gelatinous mass. In about one minute the mass appeared more mucilaginous, and we think was improved. Nine bushels of cut pea straw were then placed very gradually, and by one bushel at a time, in a tub twenty-eight inches high. The liquid jelly was now taken out in the scoop, and poured upon it. As each addition was made the whole was rammed down by a kind of beater, more for the purpose of mixing the mass, and confining the heat, than for any other object.

The present cost of the animals in linseed is 3s. per head per week. In addition to this they have about one bushel of cut swedes per day. The animals to which Mr. Warnes at present gives the compound are seven cattle, nine horses, and forty sheep.

Mr. Warnes occasionally mixes his compound with corn, or rather with meal. This, when used, is also sprinkled over the boiling mucilage; but when we saw the process corn was not used. So soon as the first boiling was nearly emptied from the boiler, it was again filled with water, and was ready for another boil when required.

We examined the stock carefully, and cannot compliment Mr. Warnes on the happiness of his selection. The sheep were French; and to fatten them, we should say, was next to an impossibility. The cattle were also hard feeders, but were evidently progressing rapidly.

As a test of the value of his system, Mr. Warnes has furnished us with the following remarks and experiments as illustrative of the general effects:—

"Linseed," he says, "has five essential properties, viz., mucilage, oil, albumen, gluten, and sugar. The shell, or external crust, is the hardest of all seeds, and the most difficult to break in pieces; but not too hard for the miller, who has every particle ground almost to powder, in order that all the oil may be expressed, which it could not be if coarsely crushed. This is demonstrated by the cake, in which the presence of linseed is scarcely apparent. To a similar state linseed for the cattle compounds ought to be reduced; otherwise some, at least, of the properties above described will pass off without benefit to the fattening animals. This the scientific grazier will discover by the excrements, in which he will find sufficient cause not only for grinding linseed, but also for grinding all grain or pulse, if possible, into flour. From researches like these the profitable returns for grazing upon my premises may be dated, returns such as are represented by the following figures:—

	£	s.	d.		£	s.	d.
7 Durham bullocks cost..	59	10	0..	Sold within six months for	136	10	0
10 Scotch ditto ..	100	0	0..	Ditto ditto	215	0	0
1 Cow	5	5	0..	Ditto ditto	15	0	0
10 Miscellaneous small cattle	40	5	0..	Sold within nine months ..	136	0	0
Balance down	297	10	0..				
	£502	10	0		£502	10	0
					£297	10	0
Deduct for 14 qrs. of linseed, mostly grown upon the farm, £35; and £4 for barley meal					£39	0	0
Return for 19 acres of turnips, several acres of pea straw, and about 3 months' autumnal grass for the 10 miscellaneous cattle........					£258	10	0

"The linseed, with the pea-straw and turnip-tops, were formed into compound, the turnips given raw, and the barley-meal as circumstances required. Under the old system, the turnip-tops would have been mainly destroyed, and the pea-straw used for litter. But these having been employed as above described, will account for the small consumption of turnips, and show the immense importance of such auxiliaries."

The expense of this copper, with the whole working apparatus for eighty or a hundred head of stock, Mr. Warnes states, will not be more than four pounds.

A part of Mr. Warnes' system is the feeding in boxes, the growth of linseed, the manufacture of the fibre into flax, and the soiling of cattle with green food and compound in the summer. It would swell this article beyond its legitimate limits, if the box system were more fully described. It may suffice to say, that the boxes of Mr. Warnes' have been put up very cheaply. They form two sides of what has formerly been a fold-yard. The sides have had a roof put along the wall, supported by pillars of wood, and divided by rails of any ordinary wood; the front next the yard being inclosed by two gates. The box is eight feet six inches square. Adjoining the wall is a passage, from which the food is given in troughs, which are made to slide up or down as the manure accumulates. The manure is never carted out until it is taken to the fields; and as the boxes are walled for one foot from the bottom, there is not the slightest escape of the liquid manure or of the ammonia, and therefore it is peculiarly rich.

We observed, in various parts of Norfolk, many kinds of boxes, much after Mr. Warnes' model, and some of a more costly character, which the owners might possibly consider as improvements; but, as Mr. Warnes' boxes may be erected at small expense, we say thirty to forty shillings each, and may be removed legally by a yearly tenant, they are entitled to preference.

Much has been said as to the dirt and filth, and unnatural state of the animals; but their condition is precisely the reverse; they are quiet, have exercise sufficient for healthy secretion, can feed at leisure, and, wherever we observed them, they were clean and free from smell and everything objectionable. The fact of the treading, and thorough consolidation by the animal's feet, prevents fermentation, and neutralizes the consequent evolution of gases, which would take place if mere stall-feeding were practised. On the whole, we think there are many more valid reasons in favour of than against box-feeding.

The directions given to men's minds by the experiments of Mr.

Warnes, induced trials with all kinds of modifications of linseed-cooking; but the one which has obtained the greatest amount of favour is that adopted by Mr. Marshall, late of Holme Lodge, near Thirsk. The difference between Mr. Marshall's plan and that of Mr. Warnes is, that the material cooked has not the heat applied to it directly, but to the outside of the boiler in which it is to be cooked, so that no direct application of the fire shall take place, to burn the mucilaginous matter. Mr. Marshall insists that, to cook the material properly, it must be boiled at least two hours.

His mode is this :—One pound of linseed is boiled for two or three hours in about one gallon and a-half of water. Five pounds of straw are chopped, say one inch long, and mixed with two pounds and a-half of ground oat or barley meal very intimately, which is then placed on a floor of flags or bricks, and the boiled linseed is poured upon the mass and turned. It is then allowed to cool for one or two hours, when it is ready to be given to the cattle. The numbers enumerated below are for one animal, though, of course, the food for a larger number may be cooked at the same time, preserving the same proportions. Linseed being at six shillings per bushel, the cost for each animal per week will stand thus :—

	s.	d.
12 lbs. 6 oz. of linseed per week	1	4½
32 lbs. of corn, at 11½d. per stone	2	2¼
Labour divided per head	0	6¼
Coals	0	0¼
Interest of cost of apparatus	0	1½
	4	2¾

Mr. Hutton, of Sowber Hill, who has carried out the scheme very fully, gave the following experiment with the linseed compound, as compared with oil-cake. In this the turnips were charged, as well as the compound, to make the terms equal.

Sixteen polled beasts (cows) were taken up. They were divided into two lots; each lot consisting of eight beasts, and as nearly equal in weight and condition to the other as possible.

One lot, costing 6s. 10d. per head, was fed as follows :—

	s.	d.
Linseed cake, 3 stones, at 13½d. per stone	3	4½
Turnips, 980 lbs.	3	0
Labour	0	5½
Per week for each head	6	10

The other lot was fed upon prepared food:—

	s.	d.
Linseed and ground corn	4	4
Turnips, 490 lbs.	1	6
Labour, &c.	0	5½
Coals	0	6
Per week for each head	6	9½

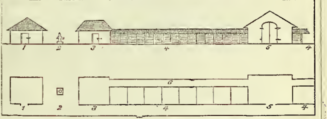
The two lots were sold at Bedale market, on two different days; four being taken from one set of beasts, and four from the other set, at each sale. The cattle fed upon prepared food realized £2 6s. 6d. more than those otherwise fed. The time occupied in feeding them was eight weeks.

The cost of the apparatus and fitting will be about £50.

On the whole, we think it very desirable to adopt one or the other process in all situations where an increased quantity and better quality of manure is a desideratum, not to mention the more profitable return, as exhibited in both the systems described.

Mr. Warnes, altogether unprejudiced in favour of his own peculiar system, was, when we visited him, making experiments on the mode recommended by some graziers, of steeping the linseed-meal in cold water for some twelve or fourteen hours—when a slight mucilaginous deposit was the result. The experiment will, no doubt, be carefully and accurately made under his direction; but our prepossessions, we confess, are in favour of the cooked materials.

The following is a plan of Mr. Warnes' shed-boxes for cattle-feeding, erected by Sir Charles Burrel, Bart., M.P.:—



1. Cooking-house, 20 ft. by 16 ft.
2. Pump.
3. Store-house for roots, &c.
4. 4. Boxes, averaging 90 square feet each.
5. Fodder-house, with tank under the floor.
6. Passage, 4 ft.

Mr. H. S. Thompson, of Moat Hall, Yorkshire, one of the most skilful and accurate investigators with whom we are acquainted, made some very important experiments on the relative value of *hot and cold preparation* of linseed. He took two animals, and fed the one on hot and the other on cold food. He had both weighed before he commenced, and both again weighed at the expiration of six weeks. The animal fed on cold food weighed, when put up, 107 stone 11 lbs.; that fed on hot, 108 stone 7 lbs. At the end of six weeks, the first had gained 2 stone 12 lbs.; while the last, the one fed on hot food, had gained 5 stone 1 lb. To guard against the one having any special aptitude to fatten which the other did not possess, he reversed the order; and then it turned out that the animal now fed on cold food, and before on hot, gained 3 stone 1 lb.; while the other, now fed on hot food, and before on cold, gained 5 stone 11 lbs.! But this was not all. While the one fed on hot food had only 5 stone 10 lbs. of Swedish turnips per day, the one fed on cold food was not satisfied till his feed was increased to 7 stones of turnips in the same time; thus showing a greater consumption of other food to make up for the want of heat!

CHAPTER VIII.

MEASUREMENT AND WEIGHT OF CATTLE.

ALMOST every farmer knows that by the use of certain kinds of food the lean frame of a healthy ox will soon become fat; his angular prominences assume a graceful rotundity, and his ribs be hidden in flesh and fat. Yet it is not every farmer that knows how to estimate the gross and nett weight of the animal.

The grazier has two most difficult duties to perform. He has to buy lean animals at a market or fair, and to estimate their feeding qualities; but, above all, he has to calculate the stones he will weigh when he is fat. It is all a money-calculating process. The farmer requires, on the average, to make £5 for summer-grazing an ordinary sized animal. Good grass will feed one beast on an acre, and thus remunerate the farmer. When beef is five shillings per stone, the grazier will require to increase the weight by twenty stones in order to pay him; hence, if he sees a beast which, in his estimation, has frame and capabilities to weigh fifty stones, he ought not to give more for it than £7 5s. But this price will not compensate the breeder; and hence he and the grazier have both to suffer when the price is only

5s. per stone. For such an animal the one will have to take £7 15s., while the other must be content with £4 10s. for grazing, instead of £5.

There are various elements which influence the weight of animals, as breed, age, quality, degree of fatness, quality of food, duration of feeding, &c. Of some of these the buyer may be able to judge: of others he can form no idea. He may conceive the breed to be good, the age to be proper, and the quality superior; he may also find the animal well fed up, both as to quality and food; but he may still be deficient in the requisite knowledge.

The *offals* of cattle have also a material influence in regulating the price. The time was when the hide and tallow would be an ample profit to the butcher; but these are now considerably reduced in price. He must, therefore, sell the best cuts of meat at more per pound than he gives for the whole, or he will be a loser of his fair share of profits.

The following may be taken as the offal of ordinary beasts:

	Stones.
Hide, tail, and horns	5
Tallow	4
Head, &c.	2
Heart and eatable portions	11
Lights, liver, &c.	2
Blood	4
Bag and entrails, with contents	14

The *proportion of live weight*, as compared with the quantity of beef, will vary as much as ten per cent. Mr. Ewart, of Newcastle (a gentleman who has paid very great attention to this subject, and whose slide-rule and cattle-gauge have obtained for him a degree of merit for skill which his labours well deserve), has drawn up a scale of per-centages, which, as his experience and observation are very great, may be taken as the standard of a pains-taking person. He classes animals as to their peculiar properties, and in his first class includes the following:

First Class.—Short-horns, Herefords, Suffolks, and Devons. Their per-centage of fat to live weight is as follows:

	Beef.		Live Weight.
Half fat	55	to	59
Moderately fat	60	,,	62
Prime, to very fat	63	,,	66
Extraordinarily fat	67	,,	70

SECOND CLASS.—Craven, Lancashire and Irish short-horns, Lincolnshire, Galloway, Angus, Aberdeenshire, Fifeshire, Norfolk, and better sorts of Welsh:

	Beef.		Live Weight.
Half fat . . .	50	to	55
Moderately fat . .	56	,,	60
Prime, to very fat . .	61	,,	63
Extraordinarily fat . .	64	,,	66

THIRD CLASS.—Argyleshire, Highland and mountain breeds:

	Beef.		Live Weight.
Half fat . . .	48	to	50
Moderately fat . .	51	,,	55
Prime, to very fat . .	57	,,	60
Extraordinarily fat . .	61	,,	66

The above are given with a view to assist the buyer who has not had experience sufficient to enable him to judge of the carcass-weight of the animal. Let him have it weighed, and make a deduction according to the above data. It may at least serve as some guide to his inexperienced judgment.

Mr. Stevens, the talented author of "The Book of the Farm," gives two rules for ascertaining the weight of cattle by *admeasurement;* but he confesses that they are not founded on any certain principle, but are completely empirical.

1*st Rule*.—Multiply the square of the girth in inches, by the length in inches, and divide the product by 7344; and the quotient will be the weight in imperial stones.

2*nd Rule*.—Square the girth in feet, and multiply it by the length in feet, multiply again by the decimal ·238, and the sum is the weight in imperial stones.

By the *length*, in all admeasurement, is intended a line from the top of the shoulder to the setting-on of the tail; and the circumference round the body, just behind the shoulders, is the *girth*.

Mr. Stevens very judiciously says that, for beasts between forty and seventy stones, the rules of admeasurement apply pretty nearly; but below or above these weights, they cannot at all be depended upon.

Mr. Ewart's slide-rule is by far the simplest and most beautiful of all modes of measurement. The girth is simply set to the length on two lines marked on the wood; and the weight is shown above, according to the class, without the slightest calculation. We have been assured by Mr. Peter Stephenson, of Rainton—a most accurate agriculturist—that he finds it quite accurate enough to depend upon.

We give another and approved rule:

Measure the girth close behind the shoulder, and the length from the fore-part of the shoulder-blade, along the back, to the bone at the tail, which is in a vertical line with the buttock, both in feet. Multiply the square of the girth, expressed in feet, by five times the length, and divide the product by 21: the quotient is the weight nearly of the four quarters, in imperial stones, of 14lb. avoirdupois. For example, if the girth be 6½ feet and the length 5¼ feet, we shall have 6½ multiplied by 6½, making 42¼; and 5¼ multiplied by 5, making 26¼; then 42¼ multiplied by 26¼, making 1,109·6; and this, divided by 21, gives 52·84 stones, nearly, or 52 stones 11lb. It is to be observed, however, that in very fat cattle the four quarters will be about one-twentieth more; while in those in a very lean state they will be about one-twentieth less than the weight obtained by this rule. The four quarters are little more than half the weight of the living animal; the skin weighing about the eighteenth part, and the tallow about the twelfth part of the whole.

CHAPTER IX.

DISEASES OF CATTLE, AND THEIR REMEDIES.

This is perhaps the most unsatisfactory division on which a writer on cattle can pretend to write. There are more cattle destroyed than cured by the strange quackery and drenching pursued by their over-officious owners; and to write anything to encourage a system so ruinous, is to perpetuate the evil.

The first thing a dairyman or grazier does is to get a long list of "receipts" inserted in an "*omnium gatherum*" of a book, classified or not, but all under the names of certain diseases. A sow falls ill. She has the yellows, or the staggers, or the worms—not because there are any clear and decided symptoms, but because the owner fancies it is so; and his specific is administered. He watches intently, and no good effect is produced: he runs for another medicine prescribed by another hand—the one opposing, and perhaps counteracting, the other. One neighbour looks in, and perhaps another. Each advises a medicine as empirical as that of the owner, and all must be given, until the symptoms increase, and get so bad that the village quack is sent for, who is more clever than the rest because he has a larger range of "receipts;" and he adds his quota of drugs, until the beast dies, poisoned by medicine!

Now, so long as unprofessional men will continue to prescribe and treat obstinate and complicated complaints, and so long as the public press will pander to the receipt-mania, there is no hope of any amendment. Having had a remarkable instance of the danger attending it, we shall certainly lend no aid to the system. We had a fine year-old short-horn ill. It singled off from the rest, and refused to eat. It drooped its ears, had a dry nose and a staring skin. We saw it was out of health. It was watched; and it voided a watery-like stool. It had the diarrhœa. We gave it cordials and astringents. It got worse. We sent for a skilful veterinary surgeon. He said it wanted physic. How so? it was sinking under diarrhœa. No: it was inflammation of the bowels, which were pouring out mucus from the rectum; but the fæces were hard, and bound up in the bowels. He gave it a dose of oil, when it voided hard pellets of dung, and mended. Had we continued the doses with which we commenced, the animal would have been poisoned!

But there are some plain and manifest ailments, where the farmer may himself administer simple medicines; and there are some cases of emergency, too, where it may be necessary to do something, till professional aid can be obtained. To these cases we shall advért, and take the complaints in the order of their frequency.

FELON.

This is a complaint common to all kinds of cattle, but especially the tender breeds, although little noticed in the well-known works on veterinary science. It proceeds from cold and exposure, and is accompanied by low fever. The beast is more or less off his food. His coat is staring, his eye dull, his nose dry, and his *back sore*. He will flinch from the touch; and his teeth feel loose. This is an attack of felon. He requires rousing by cordials. Let him be housed; and give him a drink—1 oz. of turmeric, 1 oz. fenugreek, 1 oz. liquorice, 1 oz. aniseed powder, in a quart of ale; and he will generally recover: if not, repeat the dose. A very common and very safe process is also to divide the nerve of the under side of the tail. This relieves the back, and fastens the teeth. This operation is thus performed: Feel for a soft place in the under side of the tail. The knobs are the joints: the soft place is the bone. Cut the skin across at the soft part; and it will bleed for eight or ten minutes. Tie up the tail with a piece of linen cloth; and great relief will be afforded. This is not mentioned in any work we ever met with; but we have seen its efficacy in hundreds of instances.

HOVEN, BLOWN, OR "OVER-FULL."

Sometimes a change of food, or a feed of wet clover, or potatoes greedily eaten, will induce fermentation in the stomach, instead of digestion. The sides will be blown up, until the stomach presses on the skin with a force which renders it hard to the fingers. For this the probang is by far the best remedy. Introduce it into the stomach by the throat; and the foul air will immediately escape. This instrument is not always at hand, and the beast will lie down; and the disease may continue till the walls of the stomach are ruptured. In these cases an ounce of ammonia will often give relief. A pint of vinegar we have known to effect it; but the safest remedy is a *pint of linseed oil.* It lubricates and opens the orifices of the stomach, and assists the air to escape. Gentle exercise will be useful; but all violence, and, above all, such horrid doses as tar and salt, given with the idea of making them eject their saliva, can only do harm. It sometimes becomes necessary to cut into the stomach—an operation which a veterinary surgeon alone can perform.

CHOKING.

In winter, a beast will often get a turnip fast in its throat, which will resist all efforts to force it up or down; and, what is worse, when once this has taken place, the animal will ever afterwards be liable to the same accident. The mouth should first be carefully examined, to see whether the turnip cannot be extracted with the hand; and, if it be practicable, this is by far the best mode. If not, the probang, invented by Dr. Munro, is absolutely necessary. Let a little sweet oil be first given to the animal; and then let the probang be carefully and cautiously put down, the cup-end downward. If the turnip offers much resistance, it must again be withdrawn; and by this its position may be changed. Generally, it will go down with a very slight effort; and sometimes it may be got up by running the thumbs up each side of the neck, and gently pressing with the hand.

CALVING.

This, though not a disease, is strictly a subject of medical and surgical treatment; and, though a natural operation, is always accompanied by more or less danger. In old cows, or cows after their first and second calves, if the right presentation takes place, the calving will be effected without mechanical help. It often happens that those cows which calve unobserved do the best; and we know a very careful and successful grazier who makes a point of never interfering in ordinary cases. There is certainly more danger from premature assistance than from delay.

The waters are usually the first symptoms of decided labour. A thin, filmy bag first breaks. After this, the cow will sometimes eat, and seem comfortable for an hour. The second bag is larger and thicker, and envelopes the feet of the calf. When both the feet are there, or one begins to protrude, the other may be sought for; and when both are brought forward, mechanical assistance may be safely rendered, if the head is found between and above them. A cow-tie may be strong round each foot; and the certainty of the head being between them, is a signal for a slow and gentle pull downward towards the udder. But, above all things, *give time*. The muscles relax and give way for the calf, if proper time is allowed.

When calving is over, follow the directions formerly given in regard to the management of the mother and produce: the latter should suck, and the mother lick the calf.

False presentations will sometimes take place—a single foot, or the head, or the hind legs. In either of these cases, the operator must wait for one of the throes being over, and then gently put back the calf, and introduce his hand, which has been previously oiled, and bring forward the legs which are wanting. If this cannot easily be done, a veterinary surgeon will be necessary. When the hind legs alone are presented, it is only necessary to proceed in the usual way. In cases of difficulty, of malformation in the mother, of water in the head, or monstrosity in the calf, it is always best to call in a veterinary surgeon.

Some parties have the practice of giving every cow a calving drink. We uniformly prefer, as we said, Nature's medicine—the licking of the calf—to any and all others which can be given. If it has been a long and protracted labour, a drink of a quart of home-brewed ale, or a pound of treacle, will be found useful. If the cow refuses to lick the calf—which heifers of their first calves will sometimes do—it is seldom necessary to do more than run the hand over the newly-dropped calf, and then pass it across the mouth and lips of the mother.

Abortion is a practice with some individual cows, and is often the result of the presence of blood, or bad smells arising from putrid matter decaying near the cow-houses or yards. Once introduced into a cow-house, it often so affects the imaginations of the rest as to become epidemic. Let the cow and the remains of the calf be instantly removed from the rest, and kept alone and quiet. Chloride of lime should be plentifully sprinkled near the stall where she was; and the whole of the herd should have their noses besmeared with tar.

Retention of the placenta, or failing to cleanse, sometimes occurs; and it requires great care to prevent its retention, when the expulsion does not take place in a few hours after calving. It indicates weakness and want of tone in the uterus. A mild stimulant may be given; and nothing is better than an infusion of camomile-flowers—say two handsful in a quart of water—added to a quart of good boiled ale; and, if necessary, apply an injection of soapsuds, to keep open the bowels, and prevent inflammatory action. If the seat of disease resist all efforts, and begin to putrefy, it will be necessary to consult a veterinary surgeon.

RED WATER.

This is a complaint which frequently attacks cows in summer, and, on some pastures, is of regular occurrence. A dose of eight ounces of Epsom salts, dissolved in a pint of water, if taken in an early stage, will almost invariably set the beast right. If not at hand, a pound of common salt may be given, and the dose repeated in case of need.

QUARTER FELON.

Inflammatory fever, or quarter ill, is one of the most obstinate diseases with which cattle may be afflicted; and, though odd instances of cure have been reported, they are extremely few, unless the disease has been attacked in a very early stage. It is also highly contagious, and will sometimes go through an entire herd of calves before they are a year old; for it seldom occurs after that period. The calf gets off its food, and becomes lame or stiff in one foot. The foot may be examined, and no cause of lameness discovered; but soon the disease becomes general. Air-bubbles are formed between the skin and muscles; and there is a crackling sensation to the hand, on passing it over the skin, especially in the legs. Inflammatory fever is disorganizing the body.

Preventives — as the seton in the dewlap, bleeding in autumn, doses of dyers' madder, &c.—are favourite remedies. The seton can do no harm: it may be tried; but no specific, either remedy or prevention, has yet been discovered.

FOUL IN THE FOOT.

This is a tiresome worrying disease, to which large heavy milk-cows are specially subject. It is to the cow what foot-rot is to the sheep. There is inflammatory action between the claws : it begins to discharge fetid matter, and is a source of pain and irritation, which often dries up the milk, and is frequently a painful and annoying complaint to cure.

Let the foot first be well cleaned and fomented with warm water, and all loose flesh be cut or clipped off. The foot may then be poulticed for one night with linseed-meal poultice, and then again fomented and anointed with tar. If it should smell very offensively, a little charcoal or a few drops of chloride of lime may be added to the water. Next day the inflammation will be relieved, and brought out externally by the tar. The foot may be then dressed with butyr of antimony (chloride of antimony) night and morning, and the tar applied afterwards. The foot should be confined in a boot or stocking, and kept free from dirt. A little salts or linseed oil should be given, to keep the bowels in a state of gentle activity.

MILK FEVER.

This is a common complaint in cows which are deep milkers, at least in summer. Prevention is all that the farmer can adopt. The cure, if any, must be left in the hands of the veterinary surgeon. He must, if he see the udder distended, milk the cow before calving regularly three times a day. She must be kept as cool and quiet as possible, and have mashes of bran only, for a few days after calving. This is cooling, and somewhat laxative. If the udder should be hard, which it should not be after this treatment, let it be rubbed with marshmallow ointment. A gentle dose of purgative medicine may be given if the cow is in very high condition; and she should be driven a few miles every day before calving. With these precautions, there is little danger, at least of its being fatal.

THE YELLOWS, OR JAUNDICE.

This is another form of felon, and is easily distinguishable. White cattle are peculiarly subject to this disease. It makes its first appearance by a yellowness of the eyes and under the anus. The bowels become costive, the teeth loose, the appetite gone, and rapid weakness sets in.

Give—4 oz. common salt, $\frac{1}{2}$ oz. Barbadoes aloes, 1 dr. ginger, 1 quart home-brewed ale, made into gruel.

LOSS OF CUD.

All ruminating animals are sometimes subject to this complaint. The stomach, with a sort of convulsive action, throws the half-masticated food back into the mouth, to be rechewed; but sometimes this healthy contractile tone of the stomach is lost. Give—6 dr. Barbadoes aloes, 6 oz. common salt, 3 dr. ginger, 1 oz. allspice, in a quart of gruel.

INFLAMMATION.

This is a disease known by coldness of the horns and extremities, generally accompanied by much acute and constant pain. All home-attempts to cure this disorder will be impotent. A veterinary surgeon should be at once consulted. The same may be said of *staggers*, *stranguary*, and a variety of acute disorders.

PLEURO-PNEUMONIA

Is only mentioned to say that nothing like a specific has, so far, been discovered. The fearful medicine of a gill of spirits of turpentine and a gill of spirit of sweet nitre, seems to be the most successful but desperate remedy. If the animal is fat, it is by far the best to dispose of it at once, before the flesh gets tainted with the disease. If the animal is lean, remedial measures may be tried; but they are more likely to fail than to be successful.

THE EPIDEMIC.

The disease so named, which affects the mouth with blisters and the feet with pain and inflammation, has lost much of the virulence it possessed from 1839 to 1844; but still it is sometimes troublesome. A dose of Glauber or Epsom salts, in the first stage, with shelter and bran mashes, will generally prevent evil consequences. Should the foot break out, the same treatment that we advised in foul of the foot will be useful.

DISEASES OF CALVES.

If well managed, calves are subject to few diseases; and if starved, neglected, or ill managed, they will be scarcely kept alive by medicine. The most fatal disease is the *scour*, or *diarrhœa*. As it usually proceeds from some foreign or acrid matter in the bowels, a tablespoonful of sulphur in the milk will generally remove it in due time. If it should continue after this, give a teaspoonful of laudanum and a tablespoonful of tincture of rhubarb. We once had a calf nearly dead of diarrhœa. Medicine seemed to have no impression upon the obstinate attack. It was dying. We gave it a bottle of port wine, expecting it to be dead by morning. In the morning, however, it was well, and crying out for its breakfast. A pint of good old port will often work wonders, when all other remedies have failed, both in man and beast.

COSTIVENESS.

This is sometimes a disease in calves, as well as the opposite extreme. Here it is undesirable to give medicine, unless it be very severe. A handful of onions, boiled with an ounce of fat bacon, is by far the best remedy. It never does injury, but is nutritious even to the healthy animal.

GRIPES

Is a complaint to which young calves are subject which have had sour milk given to them; and there is often acute pain exhibited, kicking of the belly with the hind legs, pawing, &c. A cure is generally effected, in a remarkably short time, by a cupful of peppermint-water and a teaspoonful of laudanum.

The great secret of keeping all animals is, to tend them carefully, and keep them well. Let the land which is thought to be subject to disease be well drained and better farmed: let the bad herbage and cold beds of the cattle be cured; and they will be healthier, and thrive better. It is safer always to pay the cake-crusher or the miller than to pay the veterinary surgeon, however skilful he may be.

In conclusion—Use the cow well; and she will be grateful. Let all your treatment be dictated by humanity and kindness; and a more patient and grateful servant you cannot have.

THE END.

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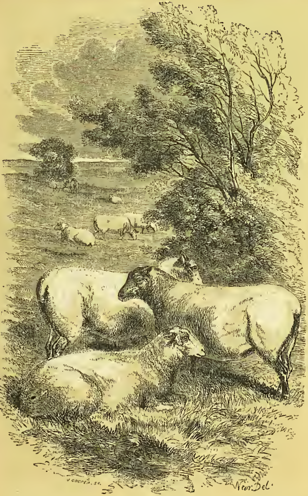
J. COOPER, SC.
Weir. Del.

SOUTHDOWN, LEICESTER, AND KENT SHEEP.

THE

SHEEP AND SHEPHERDING:

EMBRACING THE HISTORY, VARIETIES, REARING, FEEDING,
AND GENERAL MANAGEMENT OF SHEEP;

AND INCLUDING

Australian Sheep-Farming, the Spanish and
Saxon Merinos, &c.

BY M. M. MILBURN,

AUTHOR OF "THE COW," AND OF VARIOUS AGRICULTURAL PRIZE ESSAYS.

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PREFACE.

Sheep may be classed among the most useful of domestic animals; and with our ever-increasing population their culture is becoming an object of the first importance,—their wool being one of the great staples of our national economy, and their flesh the chief food not only of the humbler but of the more elevated classes of society.

With these objects in view, the writer has undertaken to embody all the information which his long experience in rural affairs has enabled him to collect respecting the breeding and rearing of sheep. The knowledge he has derived, as a farmer and a grazier, is not of a theoretical but of a practical character; and he feels assured that his agricultural brethren, on consulting these pages, will derive advantage from the useful and diversified information they convey. Of the Merino breeds, and of Australian Sheep Farming, which are daily increasing in importance, the author has treated rather diffusely; and the information there detailed, he trusts, will be found both useful and interesting.

A slight reference to the annexed Table of Contents will show the variety of subjects, connected with the culture of Sheep, on which the writer has treated.

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THE SHEEP, AND SHEPHERDING.

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CHAPTER I.

INTRODUCTORY.

Within the whole range of Zoology, it may be confidently affirmed, there is no animal more serviceable to man than the Sheep. It is the first domesticated animal mentioned in the early records of history; and the progress of civilization is, in some measure, identified with its existence. Indeed, its history may be traced to the remotest antiquity; for the care of it was first committed to the younger son of the first created man. "Abel was a keeper of sheep;" and he "brought to the Lord the firstlings of his flock, and the fat thereof."

According to the zoological classification of Cuvier, the sheep belongs to the class *Mammalia*, on account of the young being nourished with milk from the *mammæ*, or teats, of its mother;—to the order *Ruminantia*, because of its four stomachs, in which the organs of digestion are disposed for chewing the cud;—to the tribe *Capridæ*, from its horns being placed on an osseous nucleus;—and to the genus *Ovis* (a sheep) with or without horns; the sheep being chiefly distinguished from the goat by his convex forehead, by his spiral horn not projecting posteriorly, and, more than all, by the preponderance of wool over the hair.

The progress of modern civilization has not rendered sheep less important to the necessities and the enjoyments of man than they were in the earliest periods of antiquity. As food they form one of the first essentials of life, not only to the humbler classes, but to the more elevated portions of society. Their wool, too, is one of the most important articles of our social economy, which contributes largely to our trading and manufacturing industry. They supply the chief portion of that clothing which, in a country like England—so exposed to the inclemency and vicissitudes of the seasons—mainly contributes to the preservation of health, and the general comforts of existence. Their skins, also, are applied to a variety of uses. They form covers for our books, and afford materials for the legal instruments of nations, and the transfer of estates. Even their very entrails are converted to useful purposes, and serve as strings for musical instruments. Their bones, both by the chemist and the cutler, are applied to objects of the greatest utility; while their fleeces—by being converted into skins and leather—call into active employment vast multitudes of our labouring population. Nay, the very manure of sheep, which tends to enrich the pasture lands, and even to fertilize the barren downs, is a source of great profit and advantage to the farmer; and materially adds to the increased production of that cereal food which forms the staff of life.

In the general characteristics of the sheep there are, moreover, many qualities that enhance its value to mankind. In a highly improved state of husbandry, it is almost the sheet-anchor of a farmer's pursuits. In the alternating system of farming,—which constitutes the keystone of British agriculture,—the sheep forms an indispensable element. Without green crops, consolidation, and kneading, the convertible system of husbandry would fall to nothing; and an entire change would come over the whole of our best systems of farming. In these times, the lighter portions of soil are the most valuable, simply because they admit of the green crops being consumed in the land by sheep, while the stronger soils—once the "good wheat and bean lands"—are considered of inferior value; and the test of that value is, the capability, or otherwise, of bearing the "eating on" of turnips by sheep.

It is thus evident that the sheep is a manurer of the land; and there is a Swedish proverb that "the foot of the sheep is gold," for it transmutes to that metal all it touches. The wool constantly leaves its greasy deposit on the soil where the animal lies down; the rains wash out of it a combination of soda very nearly resembling soap; while from the nostrils, when feeding, is evolved the carbonic acid gas, the food of vegetation, so readily taken up by the alkalies in the soil. The dung of the sheep is voided in thick and consolidated droppings, so as to have a strong tendency to concentrate and preserve its qualities. It does not so soon evaporate as the same materials in that of the horse. The great quantity of urine also made by the sheep, in proportion to the food consumed, is again a large source of nutrition to plants; but, above all, the sheep's foot, on any sort of soil, so kneads and consolidates the surface of the land, as to render loose and shifting sand available for the growth even of wheat and beans; both of them being crops which require the most solid root-hold.

There are few plants that can bear much oxygen at their roots. A dry loose sand is so favourable to the permeation of that gas, that it is almost worthless for the cultivation of any valuable crop. But the *kneading* peculiar to the treading of sheep,—which no implement ever yet devised can imitate,—seals up the soil with the manure and moisture it contains so effectually as to prevent the access of a surplus quantity of the subtle and exciting gas. Hence arises the improvement of loose sandy soils, which the farmer by no other means can accomplish.

But the moral qualities of the sheep (if we may be allowed so to speak) are such as still further to render it an object of attention, and even admiration. It has ever been considered as the emblem of patience, forbearance, and docility. The patience, under persecution, of the Saviour of mankind, is pourtrayed under the simile of a lamb led to the slaughter, or as a sheep dumb before her shearers. Indeed, so amiable and docile is the sheep, that it has been chosen as the emblem of the Elect, who are spoken of, in innumerable places, as "a flock."

It not unfrequently happens that those animals which are characterized for their patience are charged with stupidity. Submission is often ascribed to obstinacy, and hence has the sheep been accused of want of sagacity; but this is an erroneous conclusion, arising from circumstances. Worried and terrified with dogs, the gentle and timid animal often betrays symptoms of desperation, which are construed into want of sagacity.

We have heard the story oft repeated of one sheep stupidly following another into danger, or inevitable death. We ourselves remember an instance of the leader of a flock (generally the oldest ewe or wether) leaping over the bridge at Yarm into the river Tees; and all the flock, one by one, following over the battlements. But surely this was no proof of want of sagacity; although it evinced an absence of calculation and caution. Let it be remembered, however, that while there were worrying dogs, and shepherds, and shoutings behind, all tending to terrify the animals, they could not see over the parapet of the bridge, like men of six feet high; and therefore they were unable to perceive that this wall was different from those which had usually bounded their inclosures. It is thus that many an army, led by a gallant officer, has committed as great a blunder; and yet it would be the height of absurdity, on this account, to characterize the whole race of mankind as being destitute of intelligence!

If cruelty renders the sheep obstinate, kind and friendly treatment makes it docile and intelligent. We once had a favourite sheep, which had been in its days a pet lamb. It always produced three lambs; and in every season, as soon as the throes of parturition were upon it, invariably rushed through every open gate, and bleated piteously till it gained admission into the kitchen. When it had been delivered, it willingly joined the flock; but always made up to any of the family, and rubbed against them for a handful of corn, which would appear necessary to supply the demands on its lactiferous system made by its progeny being more numerous than those which belonged to the rest of the flock.

The writer of this little treatise, when leisure permitted him to keep a flock of breeding ewes, had as docile and gentle a race of animals as ever lived. They were perfectly obedient to his call. For most of them he had names; and though they were not individually called by them, nor able to answer, they were, as a flock, altogether disposed instantly to answer to the general call "orch," and would run to meet him at the gate; or if permitted, and the gates were opened, they would come galloping up gaily from as great a distance as they could hear the sound of his voice. He well remembers when once his ewes were grazing with those of a neighbour, and had to be parted. The farmer was just in the act of sending his dog to chase the whole flock into a corner, till they could be singled out by their marks; when the writer requested him to keep in his dog, and he would "call them out." The farmer gave an incredulous smile; but the well-known "orch" soon set them running off in the direction of the gate from which the sound proceeded. This was a signal to the neighbour's flock to rush in the same direction, from an impulse of fear,—imagining, doubtless, that the dog had been seen. This terror in a short time subsided. The writer's flock hurried to the gate, and were let out, one by one, without the least difficulty; while the others, kept off by fear and timidity, remained in the pasture.

It is odd that the leader for many years of this docile flock was a large-horned black-faced Scot, and a favourite, selected from a flock of Scottish wethers, among which by some means it had strayed. She was the tamest and the most docile of the whole flock!

The secret of all this was, that they were regularly fed with a handful of oats each for a fortnight before lambing-time; and this alone gave them, in the absence of chasing dogs, a confidence in and affection for their master.

In affection for their young few domesticated animals surpass the sheep. The timorous ewe, when she has lambs, becomes the most courageous of animals. She will keep a dog at bay, and menace him by significant stamping of the foot. She attends her young with the greatest affection; and we have heard instances of ewes so fond of their lambs, that from sheer affection they have bit off their tails. So strong indeed is their attachment, that if an ewe after lambing does not regard her offspring, it is an indication well known to shepherds that she is likely to die. But if the lamb is weakly, and after a day or two cannot follow, she becomes a careless mother, and often resigns it to its fate. We once had a lamb thoroughly crippled from the well-known and often fatal disease, the "crook." It could not get up, though otherwise healthy, and had to be suckled; but so careless did the ewe become of the lamb, that nothing but force would induce her to come near it. The lamb, however, lived, and ultimately walked; though more cost was expended in rearing it than it was worth.

Strong as are the instincts of the sheep this may be broken by excessive domestication. Pet lambs brought up in the house seem not to have the instinct of avoiding [poisonous herbs, and often die from wanting the capability of discerning them. But it never loses the sense of dependence on man, and will always show affection and gratitude for the kindness shown in its early helplessness. We cannot but deprecate the taste which seems to delight in such painful subjects being hung upon the walls as engravings of the "sale of the pet lamb." It is a pity to make the fine feelings of children, and the coldness of heart of the insensitive butcher taking away their companion and treasure *for money*, the familiar subject of daily observation. It only hardens the heart.

In England there are no certain means of ascertaining the exact number of sheep. In France, where some attention is paid to agricultural statistics, there were said, in 1839, to be 31,864,247. Mr. Porter describes the British sheep as numbering only 19,000,000 in 1800; but as increased in 1828 to 26,000,000; while with some probability of accuracy, Colquhoun estimated them, in 1800, as high as 42,000,000. M'Culloch is far below the mark in putting them down in 1839 at 32,000,000. The most probable estimate is that of the Frenchman, M. Ternieux, who stated them to be 55,000,000, and valued the produce of the wool at £9,000,000 per annum. But assuming that there are in Great Britain 60,000,000 sheep, and valuing them at £1 10s. each, it will give the enormous sum of £90,000,000; and if to this, the very moderate sum of £10,000,000 be added for their wool, it will give the gross value of the flocks of this country at one hundred millions of money.

Mutton forms one of the great staple articles of food in this country. It is a favourite diet both for the invalid and the epicure, for the luxurious tables of the rich, and for the humble board of the peasant.

Fat mutton had once a wider range of admirers than at present. The fattest animals were the best. A dish of potatoes was placed in the common oven, and over it the fat loin of a Leicester sheep. This made a great mass of gravy. The master of the house dined off the meat, while his family equally fared on the delicious and saturated potatoes. But at the present time luxury has almost banished the fat Leicester mutton from the tables of the manufacturing operative, and is more confined to those engaged in the mining districts. The Southdown and the Highland Scot, the Cheviot and the half-bred (small in joint and full of flavour, with less fat), seem to be the kind of sheep which the spread of luxury and epicurianism demands in the manufacturing districts of the country; and therefore the present tendencies of breeders must be somewhat checked, if not altogether reversed.

Still, however, the flesh of the sheep has lost none of its popularity. They may change the kind of animal; but as to any neglect of the flesh altogether, it is out of the question. The Leicesters, the Cotswolds, and the Teeswaters, will, if this system continues, have to give way at least partially to crosses with the mountain breed, and the class of sheep in this country will cease to be so large, or possibly so symmetrical; but taste must be consulted, and the breeders' predilections will have to give way to profit.

CHAPTER II.

ORIGIN OF SHEEP, AND THE BREEDS OF FOREIGN COUNTRIES.

If the original breeds of cattle and horses be involved in obscurity, there appears a far denser cloud hanging over the investigation of the primeval origin of the sheep. From the earliest periods of antiquity, we find a variety of breeds, with different characteristics; as the horned and the hornless—the black and the white—and also a mixture of both. In one place we have them covered with long wool, and in another with short, while in other localities we have them destitute of wool altogether and covered with hair; thus presenting as wide a difference within a few degrees of latitude as there is between some species of the sheep, and the goat or the red deer. There is not more difference between the lethargic flesh-mountain-breed of Leicester, sleeping among the fat pastures of Lincolnshire, and the black-faced Highland Scot, skipping from hill to hill, and picking a morsel amongst the mosses and scanty heather of that cold and barren land, than there is between the last-mentioned species and the goat; and yet we are forbid to class the goat amongst the sheep, although animals as discordant, and even more so, are to be so classed in another direction.

The question for consideration is, whether the original sheep was the woolly inhabitant of the cold north; or the hairy denizen of the hot sultry east? Or was it made up of some medium animal (now extinct) of these apparently contradictory and discordant races? We have absolutely no information. The only resources we have are the sacred records of early ages, dictated by Omniscience for the instruction of man. We have to depend altogether on the incidental notices of the animal for any distinct knowledge of the qualities it possesses.

Of all quadrupeds, the sheep appears to have been domesticated the earliest. From its size and manageability, it would be an easy task; but this conveys the idea rather of a tame northern sheep than of the wild and agile tenant of the rocky steppes of the east or the south. Sheep-inclosures, of a date so early as the second generation of man, forbid the idea of the sheep being a *wild* animal, when "Abel was a keeper (or feeder) of sheep." Neither could the animal there be the fleshless deer-like race which some have represented it; for "fat" is mentioned among the earliest offerings as the product of the sheep.

Nearly all writers agree that if the sheep had not an origin different from anything we now possess, it sprang from the domestication of the Musmon or the Argali. The former is an inhabitant of Sardinia, Africa, and America; and the latter is confined to the centre and north of Asia.

The MUSMON, or MOUFLON, the *Ovis Mouflon* of Buffon, is found in Asia, Sardinia, and the Islands of the Grecian Archipelago, in

Greece, and in the western part of European Turkey. It is two feet and a half in height, and about three feet and a half long. It has large semicircular and wrinkled horns, bending gracefully backward, and somewhat resembling the black-faced sheep of the Highlands. They are, however, much thicker, usually measuring from twelve to sixteen inches at the base, and sometimes as much as twenty-two inches in length. The colour is grey, and the animal is covered with *hair* of a curling and woolly kind. There are a few black hairs about the head. The female either has very small horns or is altogether destitute of that appendage. The breed invariably inhabit the sides of hills, or their tops in very temperate latitudes. They always herd together for mutual defence; and, like other gregarious animals, under the protection of the largest and strongest rams. At the rutting season they separate into smaller flocks, and very savage battles take place among the males. They have usually two lambs, dropped in April or May, which the dams, in case of need, defend with great courage.

These animals, according to Cuvier, are very dull and untameable. He says that "domestication has had no influence" in taming them; "it merely accustoms them to the presence of new objects; and they are no longer affrighted at the sight of man, but rather seem to acquire more confidence in their own powers as they become more familiarized with us; for, instead of avoiding their keeper, especially the males, they attack him with fury." There is another peculiarity in these animals; their flesh is well-flavoured; but they are always in lean condition. Their skins are very thick, and almost impervious.

The ARGALI (*Ovis Ammon*) has a much wider range of habitat than the Musmon, and its general characteristics much resemble those of the sheep. It inhabits the tops of mountains in cold latitudes, and is common in Siberia. In the highest mountain chains of North America, it is known as the Rocky Mountain Sheep, while the African type is found in Persia, where it inhabits the central regions. The Siberian Argali seems to have attracted by far the most attention of any of the species. It is upwards of three feet high, and four feet from the nape of the neck to the tail. The horns of the male are very large, being at the base about twelve inches in circumference, and from three to four feet in length. They curve backwards and outwards, so as to make two-thirds of a circle, and are wrinkled at the base. The tail is very short, and the hoofs small. The head closely resembles that of a ram, and its colour is grey. The body is brown, with a yellowish streak on the back. It is covered with short hair in summer, but in winter this covering assumes a sort of *woolly* character, rough in texture and somewhat curly, and about one inch and a half in length. The ewes have smaller horns, though they are sometimes altogether destitute of these appendages.

The ewes drop their lambs in March, and separate from the rams. Their flesh is *fat* in summer, though they usually become lean in winter. They are extremely timid, and usually herd in small flocks; but, though untameable when grown up, the young are easily domesticated. When pursued they will turn and look at the pursuer, as is common in our sheep. Sometimes, in fighting, the males become locked in each others horns; and then are either destroyed by being dashed down the hills or precipieces, or become an easy prey to the sportsman or hunter.

Applying our knowledge, as obtained inferentially from the most ancient of records, we find incidental notices tending to fix the character of the earliest sheep, of which history informs us, with the one or the other of the class of animals above referred to, but especially the latter. Abel had "firstlings of his flock." Hence he possessed domesticated animals. The lambs of the Argali would be a ready means of procreating a flock; as they are even now easily domesticated, and which would hardly be the case with the untameable Musmon. Abel also offered fat, which is a secretion common to the Argali, but of which the Musmon is said to be destitute.

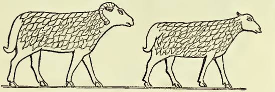
The sheep of the Patriarchs, too, had horns; at any rate the rams had that distinction. Nor could they be simply upright; as a ram, it will be remembered, was "caught in a thicket by his horns," when the staying angel arrested the hand of Abraham. The curvature of the horns being much more nearly complete in the Argali than the Musmon, which are merely bent back, renders it the most likely of the two to be entangled in a thicket.

That sheep were some of them brown in Jacob's day is quite certain, from their being set apart for his wages; and this again agrees with the colour of the Argali.

That the covering of the skin was something better than hair even in early days is quite evident from Laban's shearing his sheep; for it always indicates, at least, a woolly texture rather than a hairy one, which requires the application of the shears.

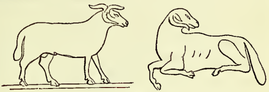
Job, who lived, it is supposed, in early patriarchal times, evidently made use of the wool of his sheep. His flock consisted, at one period, of 7,000 sheep, and at another of double that number; and he thus reminds his friends of his benevolence:—"If I have seen any perish for want of clothing, or any poor without covering; if his loins have not blessed me, and if he were not warmed with the fleece of my sheep."

If we take the records of the highest antiquity, we shall find very striking illustrations. The written records of Assyria have passed away; but the historical relics of its greatness, brought to light by modern research after lying hidden for centuries, throw a mass of information on the practices, habits, and comforts of the people who lived at vastly remote periods. The researches of Mr. Layard, at Nineveh, have brought to light several pictorial representations of the Assyrian sheep; for, though war rather than the peaceful arts seems to have been the glory of the Ninevites, "six score thousand" citizens brought for their "women and children," after the war, abundant spoils of sheep; and the sketches give a very accurate idea of the progress the Argali breed had made in supplying the wants of man at this early period. The tail had lengthened and thickened; the fat had begun to accumulate; and the hair had become more woolly. The horn, which was still nearly circular, had become smaller, and the legs and head thicker. The ram had horns; the ewe was hornless. The same species of domestication which had diminished the large horns of the ram, had still further reduced the diminutive horns of the ewe. There is a marked difference, however, between the sheep and the goats of Layard's figures. The latter have always the upright tapering horns, and are quite unmistakeably different from the sheep.



ASSYRIAN SHEEP—FROM THE NINEVEH MARBLES.

Egypt, another great nation of antiquity, whose history is altogether pictorial, was not celebrated for its sheep. The Egyptians hated shepherds, on account of their historical associations; and the country was unsuited, from the overflowings of the Nile and its rank luxuriant vegetation, for the successful breeding of sheep. Hence their hieroglyphics, their sculptures, and their paintings were nearly all destitute of representations of the fleecy tribe. Of cattle, for which the Egyptians had an idolatrous veneration, there was a vast abundance; but in all the volumes of Belzoni, as far as we remember, there are only three places where sheep are represented.



SHEEP OF ANCIENT EGYPT.

We here give two instances; but as they are all unshaded, we can only give the outline. The one is in a standing position, and the other is recumbent. The horns of the former seem fanciful, but remind us of the female Argali, which has but little curvature in her horns. Of her covering there is not the slightest means of judging; but there is the long thick *tail* exhibiting either fat or wool, either of which would be indicative of an approach towards some of our modern breeds. The legs and feet are clearly those of sheep; but the body is deer-like, and very much resembling the Argali.

In the larger specimen, which is lying down, there is a horn slightly curved, but extending more forward than that of the Ninevite specimen. The tail is better defined, though the head is not very happily delineated; but the fore-foot and its position clearly indicate that the draughtsman understood the natural history of the sheep better than the painter who drew three pigs feeding at a trough, without one of them having a foot in it.

The ABYSSINIAN sheep (or Persian, as it is sometimes called) is but a remove from the Argali even at the present time; and is entirely identical in character with the drawings just given, if it can be said to be so far improved. It inhabits the shores of the Red Sea. It has a shortish tail and a coarse hairy wool, and is of a greyish or brownish colour. It has horns diverging from their roots, and bent so as to form a large portion of a circle. The relationship is very close. It is not difficult to imagine this long-legged, horned, hair-covered sheep to be a variety of the Argali. It is by no means unreasonable to suppose it to be similar to the drawings of Layard or Belzoni. It requires a very little stretch of imagination or of credulity to conceive or to believe that it did not require six times a thousand centuries to effect the change. But it is another thing to squeeze a somnolent Leicester out of an Argali; for to that, it will be seen, we unhesitatingly give the merit of the original of our own sheep of every kind. For how does the *hair* become *wool?* We know the coverings of animals, as down, wool, and hair; but it is not very easy to define the distinction, though there is a distinction so great, that it is impossible almost to conceive how the one can be transmuted to the other. Yet this is quite easy; it is what is continually occurring even in a very short period, and has been frequently noticed both at home and abroad.

Dr. John Davy says, in the Philosophical Journal for April 1852,—"The sheep from Barbadoes, originally from an English stock, affords a striking example of the change that may be effected by climate, in a few generations, in the character of the hair of an animal. In that island, instances are frequently to be seen of sheep in which hair has so taken the place of wool (using the terms in their usual acceptation), that, were it not for the form of the animal—and that is not altogether free from change—it would be impossible to suppose that they belonged to the same species as our English sheep." He carefully examined two specimens of hair—one from a sheep two years old, the other from one a year old. Both were of the same colour, a light reddish-brown, and the same length. "The hair of the three-year-old," he proceeds to say, "was coarser than that of the one-year-old; it consisted chiefly of harsh fibres, slightly tortuous, each about the 180th of an inch in diameter, some cylindrical, others more or less flattened, all looking towards a point at their distal extremity. The hair of the one-year-old consisted of coarse and fine fibres in about equal portions, the one about the 363rd of an inch in diameter, the other the 1333rd of an inch; the former resembling the hair of the older sheep, the latter having the appearance of wool, both in its fineness and general aspect, whether seen with the naked eye or under the microscope. The presence of a portion of wool underneath the hair of the younger sheep accords, I may remark, with the belief of my friend, that all the very young lambs of the island have wool, which gradually passes into hair as they grow older." This, he writes, he thinks is the fact. The doctor then expatiates on the care "Divine Providence exerts in changing the clothing of an animal to be suitable to the climate it inhabits."

The tendency to lay on fat, it has been seen, is much more prevalent in the system of the Argali than the Musmon. This, again, proves its relationship to the fat-producing sheep to be much more intimate. But though all classes of sheep show this disposition, more or less, they vary as to the parts in which it is deposited.

Excluding at present the British sheep from remark, they may be divided into two classes—those which secrete and deposit the fat on their *rumps*, and those which secrete and deposit it on their *tails*. This peculiarity naturally divides the principal foreign breeds of sheep. The first are the most remarkable—

THE FAT-TAILED RACE OF SHEEP.

The *Wallachian sheep* is a remarkable animal, and altogether the most beautiful, as a picture, of all the various breeds. They are common in the whole of Southern Russia. The horns of the ram are of a peculiarly tall and spiral form. The wool is of a hairy character, but beautifully white. The tail, however, is the peculiarity. Kohl, in his Russia, says, "it really carries its fat about in its tail, which grows into a shape something similar to a pear, swelling at both sides to an enormous size, and tapering to a point at the extremity." The Russian shepherds are a very dull and helpless race of men, and more credit is due to the dogs and goats which accompany the flocks for their care of the animals than to these serfs, who are indolent and dull of comprehension. About four goats are associated with a flock of every hundred sheep to face the Pontine hurricanes, and to lead the sheep over ravines, and by the sides of steppes, which otherwise neither the sheep nor their shepherds would face. The sheep *follow* the courageous goats; and on once making the effort, they have powers quite equal to the task. The shepherds are strictly nomadic. They wander from pasture to pasture, accompanied by their dogs and a wagon, which is their kitchen and bed. The sheep are collected for the night into as narrow a compass as possible. The dogs watch them, each sleeping on a mat; and with this the flock is generally secure from the wolves, who prowl about in the hope of finding some stray or sickly animal on some unguarded point. This race of sheep has spread for a great distance over Hungary, Bohemia, and Austria. The peasants still use the shaggy skins for coats, which are an ample protection from the cold blasts of the northern climate.

The tail of the Wallachian sheep is large and fat, also more from its length than its breadth; a characteristic in which it differs from the African sheep, to which we shall hereafter allude.

The *Persian Sheep* is another fat-tailed variety, and is mixed up with others which develop the fat in other parts of the body. The eastern mode of keeping wandering flocks appears still to be, like many other eastern customs, obstinately adhered to. Its wool is of a long hairy grey, and extremely coarse. It also has horns, and these disposed very like those of which we gave a specimen from the ruins of Nineveh; and it requires but little stretch of the imagination to conceive how it is very possible that the slow unimproving Persian may have gone on for unnumbered ages without change, without crossing,—without one lineament of the outline of the sheep being changed. The tail is a considerable accumulation of fat, tending to the pendulous, and to accumulate in a somewhat conical form. The wool is of a much finer staple than the Wallachian, and is of two kinds—a long hair-like, but thinly-dispersed wirery, and an under one from which the finest class of wools are obtained; and these are said to be equal to Cashmere in their fineness of texture.

PERSIAN SHEEP.

The *bas-reliefs* of Persepolis represent a long procession sculptured on the wall of a staircase, where two rams, attended by shepherds, form part of a migratory train of horses, asses, camels, and oxen. Whether the horns were common to both the rams and the ewes is not by any means certain; but if they were not, the Nimroud sculptures certainly indicate two distinct breeds. The tails are long and pendent, and thickening towards the end, they reach below the knee. It is odd enough that the sacrificial bull figured on the obelisk found at Nimroud is also exhibited with a long thick fat tail, an appendage very unlikely to belong to that animal; but it is probable that this is a bag attached to the animal, and part of the decorations with which he was arrayed previous to the sacrifice.

It is worthy of remark that when cattle are shown, in other and more secular characters, the hair of the tail only is made to appear; thus indicating the correctness of the observation as to the sacrificial decorations accounting for the thickness of the tail.

The *South African* sheep is of the fat-tailed kind; but instead of the long, pendulous, and conical tail, it is broad and flat. All other parts of the body are lank, and the flesh thin and flabby. The tail and its seat, but especially the former, is the reservoir of heat-producing matter, laid up in store against the cold nights and rainy seasons, when it is required for resisting the cold. Barrow, in his work on South Africa, says :—"The tail is short, broad, and flat, naked on the under side, and weighs the amazing weight of from six to twelve pounds. It is of a thin oily consistence, and is sometimes used as a substitute for butter. This tail is from twelve to eighteen inches long, and tapers downwards, being five or six inches thick near its setting on at the rump."

This sheep is covered with long curly hair of a very strong and resisting texture, which from its elasticity is used for making cushions. The wool varies foom black to grey; it is often spotted, and sometimes brown and dun. Little care is taken of the breed, and they are most inhumanly butchered by the Hottentots. Nor is their covering moro carefully preserved; it being usually allowed merely to drop off in the autumn of the year. Some individuals have a second or under coat, as was the case in the instance before alluded to. This hairy wool more resembles fur, and is used for coverlets by the superior classes of Boers. A similar sheep occurs in the same or higher latitudes, and they are found in Madras and Bengal.

In *Northern Africa* a similarly formed animal occurs, especially in *Barbary*. It has three and sometimes four horns; but its tail is thinner and fatter than the South African variety. Its colour is chiefly white; and while the anterior parts are covered with soft hair, the posterior have on them fine wool. The ears are pendulous.

With the *Syrian Sheep* we shall conclude the fat-tailed variety, which spread over a vast extent of the globe,—the whole of known Africa, more or less numerously; the empires of Hindostan and China; and part of Russia.

Aristotle speaks of the Syrian sheep in his day, and names a variety which had tails a cubit broad. Such a naturalist ought certainly to be credited. Dr. Russell describes the tails of modern Syrian sheep as weighing 50 lbs.; but these are house-fed animals, and certainly exceptions to the general rule. In some cases it is necessary to have it protected, and even placed in a rude carriage, so unwieldy does it become, and liable to damage. Indeed this is not at all improbable, when a weight approaching 50 lbs. has to be supported, and that consisting of a remarkably delicate adipose matter. The head is bare, and the horns semicircular, and bending downwards. The ears are pendulous, and the face free from wool. The throat is covered with long shaggy hair, projecting almost as far forward as its mouth. The posterior parts are woolly, and the tail reaches nearly to the fetlock joint, which it would do if it did not turn upwards at its pointed tip.

THE FAT-RUMPED BREEDS OF SHEEP.

In this country we have far less difficulty in realizing a fat-*rumped* than a fat-*tailed* breed of sheep; for our own Leicesters are often very amazing instances of "ugly fat" deposits on the rump. In these the tail is lost in fat, and that which, in the cases before instanced, seem to be calculated to carry the extraneous supply of fuel food for the animal, is now lost in the accumulation of the same material in another part.

The *Tartarian sheep* is a type of this class. It is hornless, and as thin and gaunt in its general contour as the difference can possibly be. Its head much resembles the former, and its horns are of a similar kind. It turns downwards, and describes two-thirds of a circle. Its ears are also pendulous, and reach to the bottom of the jaw. Its shoulders are small and thin; but its head somewhat deep but not forward. Behind the shoulders it is small, and considerably deficient of flesh on the sides and ribs. The leg is also short and thin, as regards its muscular parts; but the whole vital power of the animal seems to tend to the production of the perfect cushions of fat by the sides of the tail, which absolutely bury it. The female has smaller horns, or is altogether deficient of them.

The colour varies like those of the African races. The race is usually roan, or of a light brown, mixed cast, while the ewe is black. The wool is somewhat short, and fine in quality. The weight of fat about the rump will be nearly as much as that of the fattest tailed Syrian, viz., thirty to forty pounds.

It should be borne in mind that the fat of the rump of these sheep is similar to that of the tail of the fat-tailed, and different from the fat of our mutton. On this Dr. Anderson appropriately observes:—"There is no meat on the body of our common breeds of European sheep which in many of its distinguishing characteristics resembles that of the tail of the broad-tailed sheep of the southern parts of Africa or Asia; far less does any part of the flesh of our mutton bear the smallest similitude to that of the hemispherical bumps on the bullocks of the Steatopagu breed, which so much abounds in the northern part of Asia. The humps are called fat, because they resemble that substance in colour and consistency more than the lean of mutton, but it differs externally from the fat that is found on any part of the body of our sheep."

The *Persian Hornless* sheep is another variety of fat-rumped sheep, which is very different from all the kinds we have before described. The fine head and neck are as destitute of wool as of horns; and the ears, though pendulous, are short. The carcass is both deeper and more cylindrical than those of any of the varieties hitherto named. The breast is deep and prominent, and well rounded in front. The body is deep, and not by any means defective behind the shoulders. The leg is small and thin; but the rumps are a cushion, or rather a double cushion of fat, so that the small tail is nearly lost, and more resembles a bead than a tail. The wool is short, but far from being fine, and is of a milky whiteness. It will weigh 16 to 20 lbs. per quarter, and is far from being a despicable kind of sheep.

There is incidental mention of the rump in the Mosaical sacrifice. Moses took the fat and the rump and all the fat that was upon the inwards. This Youatt quotes as indicative of the Jewish sheep being of the fat-rumped variety. But this is by no means conclusive. There were six parts of the ram to be burnt:—1st, the fat; 2nd, the rump; 3rd, the fat of the inwards; 4th, the caul above the liver; 5th, the two kidneys and the fat that is upon them; and 6th, the right shoulder (Exod. xxix. 22).

Now it appears to us that these directions rather oppose than support the conclusion that the rump was covered with fat. If so, why did they not specify the fat covering the rump, in the same manner as covering the kidneys? and if the mention of the rump along with other fat parts is to convey the idea that it was fat also, the mention of the shoulder would convey the same impression, which would not be at all accurate. The assumption that the fat was accumulated on the rump and legs would operate in favour of its also being equally deposited on the shoulder. We imagine that all that was intended was, that all the *best parts* were to be sacrificed in the "ram of consecration." The *internal* accumulation of fat, too, is opposed to much *external* formation.

Nearly allied to the fat-rumped sheep are the ***short-tailed sheep*** of Zetland and the Orkneys. These are extremely small and hardy, and will subsist on almost any kind of vegetation, however poor. In seasons of great want they are said to eat even dried fish. They generally run wild, and have a kind of wool mixed with hair. In their state of wildness, starvation, and neglect, the wool is not even shorn, but plucked off their backs—an operation certainly rendered less objectionable by the tendency of the wool to *moult* and fall off about Midsummer. The weight of the fleece will not be above two or three pounds, and the carcass will not often exceed thirty pounds. The method of catching them is to hunt them down with dogs.

This breed is not mentioned for the sake of a lengthened description, but rather to show the gradations between one class of animals and another.

Having disposed of the classes of *mutton-producing foreign sheep*, a very important class now demands our attention.

THE WOOL-PRODUCING BREEDS OF FOREIGN SHEEP.

Wool is valuable in proportion to its length, or the fineness of its texture. Hence animals with fleeces the most opposite in character will be generally held in estimation for the purposes of manufacture; the long wool for making worsted stuffs, blankets, and carpets; and the short for making broadcloths, merinos, and habits. By far the foremost, however, of all the foreign breeds of sheep, for the purposes of wool producing, is the

Merino Spanish sheep.—This is a breed so far superior to all others of the ovine race, for the production of that peculiarly fine wool so much in demand for the manufacture of our most costly cloths, that its breeding and culture have been objects of the first attention in almost every quarter of the globe; and there is no country where these efforts have better succeeded than in Spain, except, perhaps, in AUSTRALIA, where the breed has been brought to the highest perfection; and to which we shall hereafter direct attention.

The origin of the Merino breed is involved in the greatest obscurity. By some it is supposed to have been introduced from Barbary, possibly about the period of the irruptions of the Saracens. But this is merely conjecture. Spain, however, has long been celebrated for her wool. The Bætis, or Guadalquiver, as we shall have occasion afterwards to mention in speaking of dyeing, was said to have grey or brown wool; and Pliny says it had a red covering. Columella speaks of a cross made by his uncle, a farmer or herdsman of Bætica, in crossing the Tarentine breed with some "wild rams of an extraordinary colour, which had been brought from Africa to Cadiz"—(lib. vii). The Italian shepherds seem to have migrated to Spain, as may be inferred from Corydon's excuse to his friend Melibœus, where he says that, but for the generous bounty of which he speaks—

THE MERINO SHEEP.

> "There had I now been doomed to tend for hire
> Iberian flocks, or else of want expire."

Martial, who praises the wool of Bætica, was by birth a Spaniard; and Strabo says of the wool of Turdentia,—"Much cloth used formerly to come to this country. Now also fleeces come from it more than from Coraxi, and they are exceedingly beautiful, so that rams for breeding are sold for a talent each. Also the *fine webs* are very famous, which are made by the Saltatiæ."

It is quite evident that Spain has long been celebrated for its wools; and this partly arises from the peculiarity of its climate, and more possibly from the care bestowed by its shepherds in the breeding, management, and feeding of their flocks. That country no longer manufactures cloth, nor does she supply even the whole of the wool, for which she is so peculiarly favoured.

The Merino is altogether a remarkable sheep. Its form is neither symmetrical in itself, nor indicative of being of any value as a mutton-producing animal. It is destitute of muscle. The legs and shoulders are thin, and the space behind the shoulders almost literally bare. The head is a prominent part of the animal, while the thick spiral horns, standing *sideways*, renders the animal at once unique as regards the horn, and ill-shapen as regards the carcass, if we take English perfection as the proper standard. *The whole vital energies of the sheep are concentrated in the production of the finest and most delicate quality of wool.* The female is hornless, but produces wool as valuable, though in less quantities, than the male. The wool is so closely set, that it rather offends the English eye, and so abundant in yolk, that the outer surface is absolutely stiffened, and thus all dirty gravel, sand, and dust accumulate there, and form a sort of crust, which gives the animal a very singular appearance. The fleece usually weighs from three to five pounds, though the two shear wethers will sometimes have a fleece weighing from six to eight pounds. For this, and not for its carcass, the animal is especially valuable.

The mode of treating the Merinos in Spain—the *transhumantes*, as they are called, from their annual migrations from the high to the low lands in winter, and *vice versa*—is very peculiar. They feed in summer in the mountain ranges; and being most suited to a dry temperature, rather high than otherwise, they seem to thrive remarkably well on this pasture, which is by no means very fertile. On this they feed from the end of April till about October, when another weary march to the lowlands of Estremadura or Andalusia takes place. The ewes are put to the ram before they start, when at least six weeks travelling is before them, and they lamb at their destination in winter. They possess none of those qualities which the Englishman deems valuable in his sheep. Their milk, for the same reason as their flesh—the *tendency to secrete wool*—is both poor in quality and small in quantity; and many lambs are often slaughtered to enable the residue to obtain a sustenance. Though the lambs produced are seldom more than one at a time, fifty per cent. are often killed, in order that the milk of two mothers may be supplied to a single lamb. Possibly the annual migrations in Spain would render the animal less able to maintain its offspring; and travelling from five hundred to a thousand miles may be a bad preparative; but in Australia, and in Saxony, where the same migrating is not at work, they are anything but good milkers. The migration is now almost become national. The Spanish law provides common pasture, under restrictions and limitations, as well as legal protection to the moving flock; and though by this custom the loss is immense, it is still persevered in.

Each flock is divided into about a thousand, and is under the care of two shepherds and their dogs—the one called a *Mayoral*, and the other a *Gagal*. These convey them on their tedious journeys, sleeping on the ground by night on their way, and at their destination providing themselves with huts to protect them from the inclemency of the weather; though the climate is so mild and genial, that the country appears fitted by heaven for being the greatest and finest in the world; but despotism and priestcraft keep her amongst the very lowest of nations in wealth and intelligence.

Ten millions of sheep are at a certain time of the year driven at the rate of twenty miles per day at one journey, and the ewes in lamb. The sheep seem to know the period of this change of pasture instinctively—possibly the older sheep from habit,—and begin to show signs of satisfaction when they approach their own pasture, and of uneasiness when the period of return arrives. In the April return from their lowland pasture to the mountains where they feed in summer, the annual shearing takes place, and is a very bustling operation. Large buildings are provided in the line of their march; and the sheep are crowded into them on their way preparatory to their being shorn. This heats the sheep, and superinduces very profuse perspiration. It also assists the separation of the fleece, which, from its closeness, is difficult to shear, and which, from its shortness, requires to be cut as closely as possible. From a hundred to two hundred shearers commence at once; and an entire flock of a thousand sheep is shorn in a single day. The wool, when cut, is separated into five divisions; the first quality commencing at the top of the shoulders, and taking the rump and saddle; the second occupies the thigh and the space behind the neck; the third the belly; and the remainder the tail, the cheeks, the lower part of the legs, and the breast.

The *Saxon Merino* differs from the Spanish only in the mode of its treatment (not being migratory), and in the extra care with which the animals are tended. They are protected from the weather by clothing and shelter, are fed inside buildings provided specially for their use, and are regarded as part of the shepherd's family. In summer they are allowed to depasture in the open air during the day-time, but are certainly either clothed or kept up in sheds at night. This practice is at least as old as Columella. The Tarentine sheep were covered with skins, and called "soft" sheep, in reference, doubtless, to the effect the covering produced on the wool. Columella insists on the care it was necessary to bestow on these sheep as regarded food, warmth, and cleanliness. He says they were principally brought up in the house. In his days the same practice was common in Spain, and followed by the Roman settlers in the north of Gaul.

The winter food of the Saxon Merinos consists of hay, or different kinds of straw, supplied at various times of the day, and oats. The rams are carefully fed with oats for fourteen days before being put to the ewes; and eighty of the latter are allowed to one of the former. Equal care is bestowed on the lambs. A shepherd watches the ewes, which are all housed; and every lamb when dropped is removed with its mother, as soon as it is suckled, into a separate pen. The best and freshest food is given to the mother till the lamb is trained to eat.

No attempts are made to improve the flock. They are kept only for the wool; and purity of breed is the great desideratum. If any change takes place in the animal's characteristics, that change is sure to be injurious to its wool-producing tendency, either in regard to its quantity, or, what is even of more consequence, its quality.

As may be expected, the Saxon wool is the finest in the world; and it is evident that this extra care is well remunerated by the increased value of the material produced. They are unable, however, to overcome two peculiarities of the Merino, unfavourable to its history, where it is found. It is both liable to suffer, and even die, during the period of parturition, and is very subject to the abortion of its young. Care may do much; but a larger per centage of the flock of Merinos will suffer more from these causes than almost any other. This is a drawback upon the profit of the shepherd, or owner; but it is one for which the price of the wool will at any time compensate him. The Saxon wool sells at a price far beyond that even of the Spanish Merino; for, large as is the sum obtained for the latter (varying from 3s. to 4s. per lb.), the Saxon Merino is worth from 4s. 6d. to 5s. 3d. per lb.

The care of the Saxon Merinos is, however, one of attention and housing, rather than of food. To confine the English sheep on dry straw, dependent on a grain of corn left by the thrasher, let it be changed ever so often, or supplied ever so fresh, would only be to subject the animal to starvation and death; but shelter, warmth, and dry atmosphere are of more consequence to the Merino and his wool even than superior food.

Frequent attempts have been made to introduce the Merino into England. The first was made by George the Third, who took a great interest in the naturalisation of the Merino into England, to render her as independent of foreign countries, as far as regarded the wools of luxury, as she was with respect to the long wools of economy. But the experiments altogether failed. The losses were so great as not to be compensated by the extra value of the wool; while the absence of mutton would be a defect to which the English flesh-eating people would never submit. They preferred the fine and short wool of the Down, though far inferior, because it was accompanied by a superior class of mutton. The wool did not, however, degenerate; but the low land pastures of England, with their rich luxuriant grasses and succulent herbage, were too much for the Merino. These experiments were made in 1791, from a very fine flock presented to His Majesty. They seemed even to become less hardy than when they were imported.

It is to be regretted that this trial was not made in some of the wolds of Yorkshire or Lincolnshire, so as to give the animal that peculiar dry and unsucculent pasturage which it seems to require. Shed-feeding in winter, on inferior food, seems to be the kind of treatment indicated by the habits of these sheep.

Another attempt was more recently made by the Marquis of Breadalbane. Here he adopted the most careful and skilful management. The sheep were housed, or shedded, at periods when other breeds were exposed. They had excellent keeping, perhaps an error arising from the endeavour to increase the mutton; but the three shear wethers could not be made to exceed 64 lbs. each, except in very rare cases, and these not more than 72 lbs., while less pampered breeds would realize nearly double these amounts of weight, and at an earlier period of their lives. Their constitutions appeared too weak for this exposed and moist climate.

The late Lord Western devoted considerable time and attention to the breeding of Merinos in this country. His chief efforts were directed to crossing with the Leicester; but while the frame and mutton of the animals seemed to improve, the wool in some degree varied. He obtained it, however, of a beautiful texture, and of great length. The writer saw some at least from twelve to fifteen inches long, which possessed a texture almost as fine and delicate as silk. It had, however, a peculiar knotted appearance.

An experienced and well-known agriculturist has favoured us with the following remarks on the Merino breed, which are worthy of the deepest consideration:—

"Although the importance of this breed of sheep, at the first glance, may not be fully recognized (for they are little known, and since the deaths of Lord Western and Mrs. Dorien have only been bred by Mr. Sturgeon of Grays), a little reflection will show that it can hardly be overrated; for it is this which supplies onr colonists at the Cape and Australia with the fresh blood which the nature of their climate renders periodically necessary.

"In the latter colony, gold may now absorb the frenzied attention of its population; but we must not forget that wool was the foundation of its rapid growth and prosperity, nor overlook its importance in finding employment for our ships and our manufacturing artizans by its successful cultivation.

"The Merino sheep is more distinguished for the quality of its wool than for other excellences. It presents a very peculiar appearance,—the face is beautifully soft and white; a little rise is perceptible on the points of the shoulders, as also on the back of the head; the knees incline slightly inwards, and the legs are covered with wool to the feet. The rams are horned, and the ewes almost invariably polled. The Merinos exhibit a remarkable tendency to throw out horn, their feet growing so rapidly that it is necessary to use the knife where they are not travelled much,—a provision of Nature seemingly to fit them for the migratory life their ancestors led. They endure wet weather or low situations with difficulty; but in the hot weather no sheep appear in better condition."

Mr. Sturgeon states that our climate seems to affect both the carcass and wool of imported sheep. He lately showed some tups which were bred from sheep selected in Silesia by his son, from the flocks of Prince Tichnowsky and Baron Bartenstein; and we noticed that the wool was nearly double the length of that produced by either the sire or the dam.

Nature appears to refuse to give the *finest* wool to the *largest* carcass; but Mr. Sturgeon's exertions for the last thirty years seem to have induced some relaxation in his favour; for on sheep that would, if fatted, weigh 10 or 12 stones, we find a quality of wool that can hardly be surpassed; and such sheep as (possessing tho requisites of size and form, *and the constitution peculiar to English-bred animals*) must always be in request by our colonists, and have the preference over the German-bred animals, which seem to want the size, form, constitution, and length of staple they are sent to restore.

Mr. Sturgeon's Merinos are the result of an amalgamation of the flock of his late Majesty George the Third with those of the late Lord Western and Mrs. Dorien, both of whose flocks he purchased at their deaths. To these he has added the best blood of the continent; and now, we are assured, possesses such sheep as were never before bred in this country.

SHEEP-FARMING OF AUSTRALIA.

The growth of this wonderful colony, great as it has been, is now only commencing. Its importance has not as yet been duly estimated. It is not so much for its gold as its wool, that its success is intimately bound up with the mother country.

The first sheep introduced into the country were the Bengal—a species resembling the African race—long legged, gaunt, *hairy*, Argali-like animals, which, of course, were simply useful because they were better than none. Subsequently the New Leicester and Southdown sheep were introduced, and both kinds seemed to answer for the climate. The carcass did not deteriorate, as they do in Jamaica, and as described by Dr. Davy in a previous page; but the wool, in particular, was found to improve. Still there were only some six thousand sheep in the settlement in the first year of the present century. Shortly after this the Merinos were introduced, and soon became the established breed of the colony, simply because wool was more exportable than mutton.

In no country has the Merino sheep been more successful, or its qualities more fully developed. In 1813, there were 65,000 sheep in the colony; in 1828, 536,000; they now number at least twelve millions. The supply of wool, once so utterly insignificant, may now become the mainstay of our manufacturing prosperity. In 1807, only 245 lbs. were imported; in 1839, there were 10,128,774 lbs.; and now there are importations yearly of the value of £2,600,000.

The kind of sheep in Australia is the Saxon Merino; and the peculiarities of the climate, hot as it is and dry in some seasons, seem to be suited to the development of the fleece and general success in the breeding of an animal which in other regions incurs the greatest risks.

The progress of a flock in Southern and Western Australia is thus given by George Grey, Esq., some time Governor of Australia, and late captain of the 83rd regiment:—

In Western Australia, a settler, commencing with a flock of 100 ewes would have in five years, with ordinary management—

Ewes	180
Maiden ewes	56
Wethers	164
Ewe lambs	72
Wether lambs	72
Total	544—value £800.

But in Southern Australia, a settler, commencing with the same number, would have in five years—

Ewes	540
Maiden ewes	168
Wethers	492
Ewe lambs	216
Wether lambs	216
Total	1632—value £2400.

This gives a balance in favour of Southern Australia of £1600.

To the class of jobbers called OVERLANDERS, the interior districts of Australia are indebted for their flocks and their means of success. A district soon becomes overstocked. A successful flock more than doubles itself in two years, and thus will occupy double the share of land; and at the end of eight years, sixteen times the space originally occupied. A colony is formed, a tract of favourable land opens out, and immediately the zeal and energy of these neck-or-nought men seem to be developed. Mr. Grey thus graphically describes the effects produced on a district by the Overlanders:—

"The first individual who opens a market which no Overlander has visited, rides into the district an ill-clothed, way-worn traveller. The residents do not at first cast a glance upon him, till presently it is noised about that an overland party has arrived, that a route from the stock districts has been formed, and that the incalculable advantage of abundance of cattle at a cheap rate has been secured. Landed property instantaneously rises, perhaps to double it had been a few hours before; numbers of persons find themselves suddenly made rich without an exertion on their own part; and from all parts individuals flock to seek their benefactor."

The Overlander sometimes invests £13,000 in stock, sets off over hill and dale, crossing river and swamp, wood and rock, to find a market; and sometimes he takes 8000 to 12,000 sheep to find a road to a source of demand, over roads untrenched or untrodden, except by the kangaroo and the "wraggle."

The stock pastures or stations consist usually of several shepherds, having each charge of 800 sheep. A wooden box is erected, and this is left in charge of a watcher, who cooks and provides the means of comfort on the shepherd's return at night; and then takes his turn of watcher of the flock, whilst the latter is sleeping. Sometimes two flocks are situated at one station, so that one watcher answers for two shepherds.

The life of a shepherd is an idle one, and somewhat disreputable. It is the lowest grade of employment, though he gets £25 to £30 per annum and his keep, which consists chiefly of salt provisions. These are the wages paid in ordinary times; but in the present state of things they are sometimes more than doubled or even trebled. During the day the shepherd wanders with his dogs, and allows his sheep to graze freely, but keeps them together, and drives them up at sunset to the station, to give them again in charge of the watcher. By one or the other they are daily counted in and out, and also by the general overseer, who often superintends several stations, once or twice a-week. The sheep are kept in inclosures of rude hurdles, and surrounded by the Scotch colly dogs, which instantly give an alarm if any of the wraggles or wild dogs approach, as they are the only enemies of the sheep in this favoured country, which is free from the ravages of wolves and ordinary wild beasts.

The two great "harvests" of the Australian sheep farmers are the *lambing* season and the *clip*.

In the *lambing* season, the shepherd usually obtains a bonus for every lamb he rears; and sometimes a prize is awarded to him who rears the greatest number. The lambs seldom sustain injury from anything but wet. If a rainy season ensues, many of them will die; for the Merino appears to suffer in lambing more than any other breed, and shelter for such a number of animals is out of the question.

The *clipping* season is, however, after all, the most important. The wool makes the money. The first operation is the washing. It is usually performed by damming up a small stream until it becomes a pool, which is by far the best arrangement; but as they cannot always be available, a still pool is sometimes selected. This soon becomes foul and dirty, and hence the complaint of the bad colour of much of the Australian wool. In other cases, the water is simply poured upon the animals from the mouth of a can held above them, or from a spout; and this is said to clean the wool very effectively, but to be somewhat injurious in some cases to the animal.

The clipping is mostly done by travelling labourers, who are paid by the piece. They have from three shillings to four shillings per score, with ample provisions of the most liberal kind; and usually from fifty to eighty sheep per day are easily clipped by expert shearers. Sometimes the shearer has to purchase his food of the sheep-master, and has a consideration in the price paid for the work. Shearers, however, are now difficult to obtain.

The overseer's business is to stand in a building, and enter the wool-shed to keep account, and particularly to see that the sheep are shorn bare.

There are two sorts of wool, both short, but one part shorter than the rest, called the bottom wool. This is easily run over, and when neglected is a great deterioration of the value of the wool.

The packing, folding, &c., next occupy the farmer's attention; and a dray with eight or ten oxen is despatched, with the most trustworthy servant in the establishment, to take it to the neighbouring town, perhaps Sidney—a most difficult and at times laborious journey—sometimes from 250 to 350 miles. The wool is carried in a wide vehicle, called the "bush dray," with low wheels and sides, and a pole resembling the wagons of the Wolds of Yorkshire. Iron pegs are placed on the sides of the cart to keep the packs steady. A waterproof cover is thrown over the packs. Two men usually attend it, and carry with them all the necessary provisions for the journey, and encamp under it at night, after seeing the cattle obtain the best pasturage at hand. Several sheep-masters often send their respective teams in company, for the sake of mutual protection; and they travel from twelve to fifteen miles per day. It is often two or three months before the men and bullocks return; and then the bush-wain is loaded with grocery and provisions.

The climate of Australia, though so fine, is hot; and incalculable suffering often ensues from want of rain. To an European, the scenes which sometimes occur are beyond conception. Mr. John Gould, in speaking of the climate of Australia, thus describes the occasional want of rain:—

"The thermometer frequently rises to 110°, 120°, and even 130° in the shade; and this high temperature is not unfrequently increased by the hot winds which sweep over the country from the north, and which indicate most strongly the parched and heated nature of the interior. Unlike other hot countries, this great heat and dryness is unaccompanied by night dews; and the falls of rain being uncertain and irregular, a drought of many months' duration sometimes occurs, during which the rivers and lagoons are dried up, and the land becomes a parched waste. Vegetation is burnt up, and famine spreads destruction on every side. It is easier for imagination to conceive than the pen to depict the horrors of so dreadful a visitation. The indigenous animals and birds retire to the mountains, or to more distant regions, exempt from its influence. Thousands of sheep and oxen perish; bullocks are seen dead by the roadside, or in dried up water-holes, to which, in the hope of relief, they had dragged themselves, there to fall and die. Trees are cut down for the sake of the twigs as fodder; the flocks are driven to the mountains, in the hope that water may there be found; and every effort is made to avert the impending ruin; but, in spite of all that can be done, the loss is extreme."

The three great drawbacks to Australian sheep farming are the *catarrh*, the *rot*, and the *scab*.

The *catarrh* is a disease unknown in this country, and therefore demands more attention than the other two, which are better known. It is an affection of the liver and stomach, and usually attacks the sheep in a severe drought. The animal shows symptoms of uneasiness, the nostrils discharge a dark mucus, the strength and appetite fail, and in a day or two the animal dies in great agony. This is only a beginning. The same course is at work, and hundreds, and even thousands, fall victims to the plague before it can be arrested. Indeed it seldom is arrested, until a change of weather—a refreshing rain—re-animates the parched-up ground.

The carcasses must be skinned and boiled down for the tallow, and extra servants are engaged to perform the unwelcome task. The skins are dried in the sun. Many a time the flockmaster is nearly ruined; for when part die, the rest are so enfeebled and emaciated, that their wool is of little value. In one year, and that possibly a bad one, as many as 70,000, according to the testimony of Mr. Hood, were carried off; and as the drought and catarrh often or invariably occur at the same time, the lambs are sometimes actually destroyed to prevent this last drain on the vital resources of the mother, and thus make her extinction certain. In these cases nobody will have the least remnant of an infected flock; and death and burning, to prevent the plague, is sometimes inevitable. The only alternative is that of boiling for the tallow, a process which has been of late pretty extensively adopted. The tallow from sheep taken in health, and so boiled down, is about one-third of its dead weight; and some establishments are conducted on the plan of carrying out the whole process, at a definite price per head. Ninepence per sheep is the price for the whole operation, from the slaughtering to the making the tallow marketable, the offal and refuse being the property of the boiler. If the wool is also preserved and made ready for market, threepence more will be required; so that the tallow and wool will be taken and made ready for the market, from the living animals, for one shilling per head.

The fluctuations of price which take place in Australia are necessarily very great. After a season of catarrh and loss, they will advance to the prices before indicated; while they have been as low, in a period of abundance and depression (1841 for instance), as eight to ten shillings per head.

The great desideratum in Australia is the presence of water sufficient to enable the flockmaster to wash his sheep; for, though a very small pent-up stream will be sufficient, if it is *running*, still pool-washing in this country is one very difficult and very prodigal of water. The settler will do well, therefore, to get on the banks of a stream, if possible, at once capable of washing his sheep or of transporting his wool, with sufficiency of high land to keep his flock secure from the floods of the rainy season. A small stream is not to be depended on, during the intense droughts of this fine but variable climate.

The pasturage of Australia, being less rich and moist than in this country, is very favourable to the Merino. The absence of our severe winters also renders the climate and herbage uncommonly suitable to sheep, and to the Merinos in particular. It thus becomes worth while, in selecting new locations, to choose those where the box-wood and the apple flourish, provided there be also plenty of that one great indispensable element—*water*. If he finds the timber trees possessing bark of a contracted stringy character, the soil will be unprofitable, and especially unfavourable to sheep.

Many parties are disposed to check their propensity to emigrate to Australia, on account of the gold diggings rendering the prospects of the sheep-farmer unfavourable, especially in respect to the obtaining of servants for shepherds and sheep-shearers. That danger, however, is now passing away. The many disappointed diggers are now quite adequate to re-supply the drain which the first indications of the gold fever produced, and there need be little fear of obtaining hands in sufficient abundance.

We know an instance of a young gentleman, the son of a Scottish Writer to the Signet, who has a large sheep-farm close to the diggings; and he never, for the fifteen years he has been on that continent, was able to make so much money. He finds in the disappointed diggers (and in some cases these are reduced to a state of starvation), the most facile supply of hands, and he can obtain them on very moderate terms in any number he requires, either for sheep-tending or for managing tillage land; while his near proximity to the vast mart for his produce saves him the long carriage for what he sells dear in the shape of mutton, milk, butter, cheese, and flour. It is odd enough, that this young gentleman's first location was in the precise spot where the very busiest and most active search is being made for gold. His sheep-fold was once where the most successful and productive holes are being excavated; and when he dug for his original posts, wherewith to make the inclosure, fifteen years ago, he must have been within a few inches of the gold! But if he had found it, it is probable it would have been disregarded,—so foreign to his purpose was the mining for the yellow metal, and so improbable would have been the idea that it could exist there.

Much nearer was a friend and neighbour of the preceding adventurer of making the discovery ten years ago. In digging by the side of a rivulet (now the scene of a horde of washers), he found mixed with the soil a vast number of shining yellow scales and dust. He brought home a basket-full, and showed it to his friends; when he observed that it was a metal extremely like gold. This was the signal for general laughter; but he still maintained his determination to carry it to Sydney to be assayed when next his wool went to market. To this he received such a volley of ridicule, with threats of his being made a laughing-stock in the city, that he took the basket and emptied it upon the dung-heap.

Gold was not then suspected, though there were individuals who here and there anticipated the possibility of the present discoveries. A friend of the writer's had a relative, a ship captain, who, while his vessel was loading, took his gun inland and shot game. Amongst others happened to be a kind of a duck. This, when opened, had two pieces of yellow metal in its gizzard,—one a roundish piece like a marble, and the other a scale like a thumb nail. These he preserved, and had them examined in London, when both were pronounced to be gold. This was twelve years ago, and he then declared his conviction that gold would some day be found in that country.

Thus the Goshen of shepherds, has become an Havilah of gold, and a field for emigration far surpassing, all in all, any of the *El-Dorados* pictured by romance, or suggested even by the genii-lands of the "Arabian Nights."

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Having glanced at the principal features of the mutton and wool-producing races of sheep above, it will be necessary to notice those miscellaneous kinds, which, either from their prevalence or their peculiarities, fill up the links in the chain between the Argali and the Leicester—between the small Welsh mountaineer and the large Lincoln or Teeswater; found in some one or other of the countries of the earth. We might take, for instance, the regular gradations as follows, from the Argali to the New Leicester—these being the nearest approach to the goat. The following will be a somewhat accurate scale:—

1. Argali.
2. Barbary Sheep.
3. Cape Sheep.
4. Merino.
5. Welsh Mountain Sheep.
6. Shetland Short-tailed Sheep.
7. Blackfaced Highland Sheep.
8. Cheviot Sheep.
9. Southdown Sheep.
10. Dorset Sheep.
11. Cotswold Sheep.
12. Old Leicester Sheep.
13. New Leicester Sheep.

The gradations are these:—

The *Argali* has hair, and circular side-expanding horns, and short tail.

The *Barbary* sheep has less horns, larger tail, short hair on the posterior, and wool-like hair on the neck and breast. To this breed subsequent allusion will be made.

The *Cape* sheep has a downward drooping horn, a mixture of hair and wool, and a cushion of fat on the rump; the tail is small and almost lost.

The *Merino*, as we have seen, has side spiral horns, like the Argali; short but fine wool, long pendent tail, and the breed may be considered as a step in the refining of the hair and wool of the Cape sheep.

The *Welsh* are exceedingly diminutive sheep, with short but coarse wool, horns arched upwards, light and wrinkled, with long pendent tail.

The *Shetland* sheep ought for general conformation to have preceded these. The horns are upright and more tapering, the wool shorter and finer; but the long tail gone, and more resembling the Argali and the Cape sheep.

The *Blackfaced* mug has large spiral horns, partly upright, partly proceeding sideways, long hair-like wool, long bushy tail, and of larger size.

The *Cheviot* has a compacter frame, shorter and thicker-set wool, and deposits fat externally—a peculiarity lost since the Cape sheep was referred to. It has lost its horns.

The *Southdown* has become more square and compact. He has lost his horns and wild habits, but is still active. His wool is short and fine.

The *Dorset* has larger concave-tapering and side spiral horns, external deposits of fat, long tail, but deep-formed and quiet.

The *Cotswold* has no horns; ears slightly pendent; abundance of thick-set long wool, and large heavy body.

The *Old Leicester* has no horns; large in size; full of wool; deposits mutton on the back and side; very dull and quiet; and has lost almost all traces of the Argali.

The *New Leicester* is a step in advance in the same direction; slow, quiet, hornless; deep in its chest; round-made in the sides; full behind the shoulders, and approaching a tube in shape,—as far removed from the appearance of the Argali as possible.

For the purpose of making out a little more fully the general features we have mentioned (the links as it were in the chain of connection), the description of a few more varieties amongst foreign sheep will be necessary.

The *Barbary* sheep has been partially described. It has high withers, like those of a cameleopard, the belly, hind legs, and thighs being covered with hair or fur. Its flanks are hollow. The hair about the throat and breast is very long, and the horns, though small, are bent backwards. The ears, like most of the African varieties of sheep, are decidedly pendulous. The tail is long and slender, and rather hairy towards the extremity, somewhat like that of a cow.

The throat and dewlap are pouched and pendulous, and convey the idea of loose and flabby as well as coarse flesh. It is slow and powerless in its efforts, as if it felt itself a degraded animal, different alike from the agile Argali or the stately Highlander—from the mild and patient Southdown, or the nimble and gay Merino.

The *French* sheep, in some respects, resembles the Merino, but is deficient in many of its peculiar characteristics. Though some of the varieties have doubtless traces of Merino blood, and are in some respects managed like them, they are in other respects very dissimilar. They have no horns. The neck and legs are covered with a coarse hairy wool, and the wool of the rest of the body is not by any means fine, nor gracefully curled, but rather straight, like hair. Their colour is always white. These are the *moutons de Picardie.* Many of the French varieties are migratory, like the Spanish Merinos. In May they emigrate for the low countries in the south of France, particularly for Languedoc. These migrate to the Alpine range, and are on that account led by trained goats kept for that purpose. The shepherds, like the Spanish, have about one thousand in a flock, with one dog, and a troop of asses to carry provisions and tents for the mountain summer quarters. The goats have bells to their necks, which the sheep soon learn to follow, and are completely at the command and obey the directions of the shepherd.

These migrations are said to influence the quality of the wool. But the fact is otherwise. For it is doubtless the climate to which the improvement in the texture of the wool is attributable. Though the sheep of southern France are hornless, they have fine wool, of a close frizzled texture, and nearly resembling that of the Merino. The Merinos in France have not been altogether successful; for though separate and individual experiments have been now and then favourable, they seem to be more suited to a warmer climate, and Spain seems to be the especial European home of the Merinos.

The *Iceland* sheep are noticed because of the peculiarity of their horns. They usually—the rams in particular—have three horns. Two bending downwards, and nearly semi-circular, the other rising out of the middle of the forehead, tending upwards, and slightly forwards. They sometimes, however, have a perfect forest; and instances are mentioned where as many as eight horns have grown from the head of a single animal,—and this, while the cattle are *hornless*, is a remarkable circumstance.

This kind of sheep is small, and covered with long hairy wool, but with a bare tail. He is a hardy active animal, and feeds in droves, crowding together in snow-storms, or taking shelter in holes of the rocks or mountains, and often perishing from hunger. Like the Shetland sheep, they will eat dry or frozen fish, and in seasons of extreme pinching, they will even gnaw the bones after they have devoured the flesh.

For milk, as well as for their warm fleece, these patient and hardy animals are a great boon to the poor snow-covered Icelanders. The wool forms the material of the long hair-like articles before described, and also the under covering of fine downy wool. The colour is brown, or approaching to black—a rule the converse of what usually happens in a cold climate. Wild animals are generally white, during winter, in snow-covered countries; but domesticated ones are subject to a different law, and are often of other colours. The former have the colour of nature, to protect them from the far-seeing eye of their pursuer; while the latter have a diverse one, to render them more easily recognizable by their protectors.

The *Tunis* sheep is the best wool-bearing sheep on the African continent; and if we can consider the manufacture of field caps as indicative of the quality of the wool, it may be said to be at least capable of being turned to good account.

The Tunis sheep has been exported to North America, and there it will sometimes weigh as much as 183 lbs., and show symptoms of depositing fat on the saddles, shoulders, and legs. The African mind, however, is slow, either at originality or adopting any improvements; and it is not likely that they will take place to any considerable extent, until a far greater amount of civilization is imparted.

The energy of mind consequent upon Christian institutions is the only certain lever which can ever be successfully applied to the African temperament, in the promotion of great social objects.

CHAPTER III.

HISTORY OF THE BRITISH SHEEP.

In a subsequent chapter on the woollen trade, the British sheep and its history have to be necessarily interwoven; so that the present chapter will only give an outline of the history of the sheep. Indeed the materials are so few that much more could not be easily collected. In the earliest record they have hardly assumed the importance to be distinguished in descriptions of cattle; but historians generally take it for granted that the term "small cattle" invariably includes them. Herodotus may be quoted as an instance. Speaking of the Persians, he says of their feasts :—"the wealthy provide an ox, a horse, a camel, and an ass, roasted whole in furnaces, and the poor provide the *smaller* cattle;" evidently, by distinction, meaning sheep and goats. Therefore when Cæsar spoke of the cattle of the ancient Britons it is probable that sheep were included.

Little is known about sheep till the Conquest, when an acre of land and four sheep were deemed equivalent. The wolves, which appear to have inhabited the ancient forsets in the Saxon period, were objects of extermination by that pastoral race. That they were not all destroyed is certain; nay, that the few left were preserved, probably as objects of chase, is equally true, as late as the reign of Stephen; for Corran Duke of Brittany granted to the abbey of Fores in Wenslydale, Yorkshire, "pasturage and grass in the adjoining forest; but reserved a proviso against using their mastiffs to drive away the wolves. In the Saxon period the sheep were valued at one shilling, until fourteen weeks after Easter, when it was probably fatter, from the grass having then sprung up, and would be of an increased value.

The Saxon chronicle incidentally mentions that a great and destructive epidemic prevailed, in 1041, amongst cattle and sheep; by which, with one that succeeded in 1125, most of them were destroyed. This was possibly a reason why the sheep became of a greater value. Towards the close of the reign of Henry I. they were worth 20s., and in the second Henry's reign 25s.

In 1387 the Hawstead farm in Sussex, containing 572 acres, had only 92 "muttons" and "10 score hoggerills," less than three hundred altogether,—a large stock of sheep, considering they grew no winter green food for their flocks at that period.

About this time there seem to have been several kinds of sheep in the country, which produced wool of very different values. In 1341, while the Cumberland and Westmoreland wools—doubtless those of the coarse mountain breeds—were worth only 10s. 1d. per stone, those of Salop—the fine short wools—were worth 5s.

Two years afterwards, 1343, we have a great variation in prices. The Shropshire is still at the top of the list, being £9 6s. 8d. per sack;—while the Cornwall wool—doubtless from another mountain or forest breed, possibly the original Dartmoor sheep—was worth less than half that money, viz., £4 per sack.

The greatest impetus to sheep-farming in this country was doubtless the introduction of turnips. In 1684, Worlidge says "sheep fatten very well on turnips, which prove an excellent nourishment for them in hard winters when fodder is scarce; for they will not only eat the greens, but feed on the roots in the ground, and scoop them hollow even to the skin." "Ten acres," says he, "sown with clover and turnips, will feed as many sheep as one hundred acres would have done before."

Never had the pastoral and flesh-loving people of this country a better mode of securing, even from arable land, a supply of mutton, and which is by far the most plentiful at the period of winter, when fat or eatable mutton must, at an earlier period, have been a difficulty to obtain, and possibly only obtained at the expense of hay and corn.

Before this period, indeed, it was difficult to see how so many sheep could be kept alive in winter. Harrison, who wrote a century before Worlidge, says that some husbandmen possessed as many as 20,000 sheep, though an act had been previously passed restricting one man to the number of two thousand.

In 1662, according to the Berkeleyan MSS., the price of a "sheepe was vi.ss.;" and, according to that authority, in the time of Edward the First, "a fat sheepe was worth from xvii.d. to xx.d., a lambe x.d.;" "a weight of woll" in Richard the Second's time, (twenty-one pounds), "was v.s."

Distinctions between grass-fed and corn-fed sheep—winter and summer mutton—were made by Act of Parliament in 1314. It determined the price of a "corn-fed sheep." "A lambe" is spoken of as being worth x.d. or xii.d. in the reign of the first Richard.

The first energetic and general improvement of the sheep doubtless took place in the reign of Henry the Third. In 1699 there were said to be twelve millions of sheep in the country, and the carcass value of each was 7s. 4d. The fleece averaged about 10s. 4d.; and the boast of the writers of the period was, that "no country but England and Ireland, having a sward or turf, would bear sheep producing the wool of which the English draperies were made." They were willing to let the Spanish wool have the palm for the costly dresses of the Peer; but it was insignificant—"not above 9000 pieces of these Spanish cloths were sent abroad," and these were only for the "wear of the richer sort."

To the recent improvements of the Leicester and Southdown sheep we shall not here allude; for, though it is one of the most important epochs in the history of that animal connected with this country, they will be discussed under the head of each class of animals as they pass in review. In the meantime, we shall give (chiefly from Mr. M'Culloch) a tabular synopsis of the breeds of sheep in this country, with an epitomized outline of their peculiarities, habits, &c.

Mutton-producing Sheep.

	Wool.	Weight of fleece.	Mutton per qr.	Age when killed.
Black-faced Heath	Long	3	15	3½
Dorset	Short	3½	18	2
Wiltshire	Short	3	20	3
Southdown	Short	2½	18	2
Norfolk	Short	2	18	3½
Cheviot	Short	3	16	4¼

The above are amongst those celebrated for either *quantity* or *quality* of mutton alone, and unincumbered with the other desiderata, the weight, value, or fineness of fleece. Such will be enumerated in the third list.

Wool-producing Sheep.

	Wool.	Weight of fleece.	Mutton per qr.	Age when killed.
Teeswater	Long	9	28	2
Romney Marsh	Long	8	22	2
Lincolnshire	Long	12	25	2
Ryeland	Short	2½	14	3½
Shropshire	Short	1¾	12	3½
Berkshire	Long	7	18	2½

The above are rather selected as examples than dogmatically laid down as specifically wool-producing; they all are used for mutton-growing, but the wool is a very important item in their value.

Sheep producing both Wool and Mutton.

	Wool.	Weight of fleece.	Mutton per qr.	Age when killed.
Leicesters	Long	8	22	1 to 2
Cotswold	Long	9	24	2
Dartmoor	Long	9	25	2
Exmoor	Long	6	16	2½
Bamboroughshire	Short—Long	6	18	3

There are a few sub-varieties, which it is not necessary to mention here. The above will be found the leading descriptions of British sheep, and the further peculiar characteristics of each will be enumerated in the subsequent pages.

It may be asked—Are all these breeds either useful or necessary? Cannot they be consolidated, at least, into wold or down sheep for the higher lying dry land; so as to have heavy-carcassed and wooled sheep for the rich low lands, and mountain sheep for the high hills? To this question we are as yet scarcely able to give a certain answer; but it may be partially discussed in our chapter on feeding. There is often danger of loss from too hastily either introducing or displacing the breeds from one district to another;—the new seldom succeed, the old have generally to be replaced.

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CHAPTER IV.

WOOL-PRODUCING BREEDS.

Wool is a product common nearly to the whole race of sheep, but quite indispensable to the British sheep; for though some of the Africans may be said to have a coat more resembling hair than wool, there is no dispute as to any breed known in these islands being distinctly wool-bearing. But this country is also a flesh-eating country, and therefore the breeds which are purely wool-bearing—that is, those which leave little profit for the carcass—are in this country looked upon with disfavour; and it is rather when the two are more or less combined, that the farmer is anxious to possess them. Hence no kind of sheep bred in these islands are kept exclusively for their wool-bearing, and it may seem somewhat inappropriate to divide them in any such manner. The usual mode has been to divide the different breeds by the character of the wool they produced, as long-wooled, short-wooled, or middle-wooled. But this is a classification which does not convey definitely enough the distinctive peculiarities of the several breeds; and, for the first time, we have adopted a mode suitable to the kind of united produce they afford—their carcass and their coat—rather than make a division from the characteristics of one alone. Hence this chapter will treat of those breeds which are more celebrated for their wool than their mutton; the next of those being more valued for their meat than their covering; and the third will include those to which, perhaps, no predominance can be given to the one or the other.

Wool is the covering which Nature has given to the sheep in cold climates. It is a very bad conductor of heat, and is generally more or less liberally supplied, in proportion to the nature of the climate which the animals inhabit. It is in every way suitable to protect them. Light to carry, and warm in winter, curling in long and graceful folds, it easily covers the whole of the animal but the bony face when he lies down, so as to defy the influence of the most piercing blasts.

The distinction between hair and wool, which, as we have seen in the introduction, so easily run into each other, is not readily drawn except with the aid of the microscope; and this reveals the difference. They are both tubular and conical, but the wool is completely covered with serrations like the scales of a fish; while the hair is almost smooth, with a few scattered buds, which here and there issue from its sides.

The kinds of wool nearest resembling hair are those which have the fewest serrations. That which is the farthest from it, in appearance and character, has the greatest number. Youatt describes the wool, as shown by the microscope, as resembling "a succession of joints in the form of inverted cones, the apex of the superior one being received into the cup or half excavated base of the inferior one."

The structure of the wool may not inappropriately be termed precisely that of a fir-apple, only it possesses the cylindrical instead of the conical form; and an idea of the intensity of the serrations, in some of the different breeds, may be gathered for the annexed list:—

Merino . . .	2400	serrations in an inch.
Saxony . . .	2720	,, ,,
Southdown . .	2080	,, ,,
Leicester . . .	1860	,, ,,
Cheviot . . .	1440	,, ,,
Norfolk . . .	1600	,, ,,
Wallachian . .	2080	,, ,,

To show the difference in structure between hair and wool, the following specimens are selected:—

Hair of the Wallachian Sheep, 1600 serrations in an inch.
Hair of the Tiger, covered with scales only.
Hair of the Seal, 6000 in an inch.
Hair of the Rabbit, cloudy irregularities only.

These show at once the transition. The Wallachian sheep has hair more serrated than the Cheviot wool; the seal's hair has not half the number; while that of the tiger falls off to mere scales, which are totally lost in that of the rabbit.

On some parts of the sheep, however, the hair still predominates. The head and face are covered with it, and so are the legs; and in some breeds there seems to be a struggle even here.

The head of the Merino and the Wallachian sheep is covered with wool, at least at the top, while the face rarely retains its wool; and in some individuals of the Highland blackfaced breed, the backs of the legs are decidedly woolly, at least the hind legs. It is further remarkable that, in many breeds, while the wool is one colour the hair is another. The hairy portions of the face and legs of the Southdown are black or brown, while the wool is a milky white. The same features show themselves in the black-faced Highland breeds; as if climate had changed the colour, as well as the texture of the hair; while improvement has banished hair altogether from the faces of the purest new Leicesters, which have that part almost wholly bare.

So much for the physical conformation of the covering. Its chemical constituents show it to be intimately connected with the state of the soil. Vanquelin showed the yolk of wool to be essentially soap. It had animal oil, carbonate of potash, some lime, and was, indeed, exactly similar to the household soap, being composed of alkalies and an oil. But the wool itself is a very remarkable combination. It contains 98 per cent. of organic elements, and 2 per cent. of ash. The former consists of:—

Carbon	50·65
Hydrogen	7·03
Nitrogen	17·71
Oxygen . . . . Sulphur	24·61
	100·00

The ash contains oxide of iron, sulphate of lime, phosphates of limes and magnesia; so that the sulphur is a very important element in the composition of wool. Some close statistical calculations have been made, which show that in the United Kingdom as many as five millions of pounds of sulphur are abstracted from the soil, which annually receives the sheep's wool. It is evident, therefore, that in order to have healthy animals, and a full produce of wool, there must be in the soil a sufficient supply of sulphur, of nitrogen, of potash, and of phosphorus, or the land will not enable the animal to secrete wool in perfection.

We now proceed to enumerate the principal wool-producing races of sheep. And first, the

Teeswater.—This is a remarkably long woolled and large breed of sheep—indeed, almost gigantic, for it will sometimes attain the enormous weight of 60 lbs. per quarter, or 240 lbs. weight. The fleece is peculiarly long, but somewhat coarse, very open, and thinly spread upon the back, and will weigh from 9 to 12 lbs. The Teeswater is a very old breed of sheep, and has for a very long period occupied the banks of the Tees. The same fertile valley, celebrated for its short-horn cattle, had doubtless a breed of sheep peculiar to itself, and they were no less indicative of its richness than its favoured cattle. It is, by nearly all writers, classed amongst the Lincoln sheep, and said to be an importation from thence. This is a most gratuitous assumption. The principality of Durham, celebrated for its native wild cattle and pigs, had doubtless its own peculiar breed of sheep and cattle, and the old Teeswater sheep had as much an habitat* in those rich pastures as the wild cattle of Branspeth, or the deer at Aukland Palace. The great peculiarity of the animal was its slow growth, and, at the same time, its large size and bone, its heavy, thin, and coarse wool. The length of the legs, in particular, gave it an imposing and somewhat ungainly appearance; while its thick skin made it a slow feeder, in any but its native pastures—the alluvial washings of many generations.

About twenty years ago the writer obtained two lambs, as a great favour, from a flock of pure Teeswaters, which had escaped the awful rot-year of 1829, by having access to a hay-stack, which preserved a flock of about twenty ewes, when nearly the whole race perished. The farmer forbad us having two of his best animals, and we had to be content with one. He selected another, so close in the pelt, and so unsymmetrical, that we decided in putting it off. The best was well kept, and astonished both ourselves and our visitors by its amazing size, and the great weight and quantity of its wool; but, just before shearing, it died a victim of wool and mutton. As it was skinned and not shorn, we had no mode of weighing the fleece, but it could not be lighter than 12 lbs. The load of fat, added to the envelope of heavy wool, seemed to have suffocated the animal. It was, however, exceedingly well kept.

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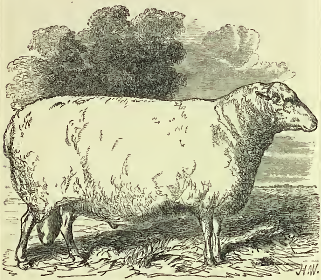
* Thoresby says, in 1703, "We passed the river Tees in a *fruitful country which produces very large sheep.*"

The pure Teeswaters are now very scarce. They have all, more or less, been improved by crosses with the Leicesters. A more beautiful cross we never saw. The Leicester shortens the leg, and reduces the bone and coarse parts; but it must be confessed that it also shortens the wool. Still it so far keeps up the character of an open fleece, that it is very excellent in a point where the Leicester is somewhat deficient. The cross is always the substitution of a Leicester instead of a Teeswater ram, to a Teeswater flock of ewes. The finest animal shown at the Liverpool meeting of the Royal Agricultural Society was one of these crosses, and it was excluded because it was not a pure Leicester. So manifest was this said mistake, that "long-woolled" was a term soon after substituted for Leicester, so as to admit sheep of this description to compete.

As this class has taken the place of the Teeswater, it may not be amiss to give a description from memory of the ram, as he appeared when shown at Liverpool. He was large, but not coarse, with pure white, long and curly, but very open wool; the head thickly set, with short whitish hair; the ears thin and small, and destitute of wool; the back extremely broad, and though wider across in the middle, was also a considerable width over the shoulders and rump; it was all filled up with firm solid but elastic flesh and fat. The legs were short, but with sufficient bone to bear the great weight of the animal, and long enough to display his figure. With little less quality than the sheep of the Duke of Rutland (who, if we remember right, carried off the prize), he would certainly have made three of him, and weighed at least 40 lbs. per quarter. The largeness of his size did not at all prevent his being fine and delicate in his useless parts. The neck was broad, but small in circumference, and without pendulous matter; the breast very deep, but proportionately wide, so as to make him walk with his fore legs a great distance apart. His legs were more fleshy, and had more mutton than those of the Leicester, which have a stronger tendency to accumulate it on the saddles or loins. The eye was gentle, mild, and placid; and he seemed as perfect a specimen of a wool-bearing *sheep* as we could well imagine.

The Teeswater sheep answer best in small flocks, and dispersed over pastures with other stock, rather than being laid on very thick upon the ground. The ewes are remarkably prolific, and usually produce two and often three lambs at a birth. They are good mothers and excellent milkers; and though almost incapable of being made fat at one year old, they will weigh twenty-five to thirty pounds per quarter at the shear without difficulty.* The contest respecting large and small sheep on good land, and the most politic course for breeding and fatting, is by no means settled. We once heard a controversy terminate as follows between a Leicester and a Teeswater breeder:—"I like something to fill the eye," says the latter; "And I to fill the pocket," said the former. Possibly both were right.



ROMNEY MARSH OR KENTISH SHEEP.

The *Romney Marsh* or Kentish sheep is not, in its external characteristics, unlike the Teeswater. Like them it inhabits a locality to which they are peculiarly suited, and where it has prevailed for a great number of years. Sir Richard Phillips says of them in his day:—"The marsh lands of Kent, used for breeding sheep and fattening cattle, are 82,000 acres; of which Romney Marsh is 44,000." This had been reclaimed, at some time, from the sea. Sir Richard doubtless speaks of this breed when he says, "Four sheep will live on an acre of moderate land in summer and two in winter." The proportion is now quintupled, but the season is reversed. He then appears to lament the deterioration of the wool of the Romneys:—"The wool of sheep deteriorates as the sheep's carcass increases; hence for some years, owing to the enlargement of the English sheep by new breeds, the wool has become too long and coarse for fine cloths. Our long and coarse wool will not unite or produce the required substance for clothing."

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* Mr. Tuke, in his Survey of the North Riding of Yorkshire, speaks of the Teeswater as being a part of the cross of nearly the whole North Riding of Yorkshire in his day, and gives some averaging instances of size and weight. He mentions Mr. Powley, of Thornton, steward, having a wether sheep, rising three years old, which weighed, when killed, 16 stones 11 lbs., or 59 lbs. per quarter nearly. It cut 6 inches of fat at the rib, and 4¾ inches on the rump.

The Romney Marsh sheep have a thick and large head, covered by a white woolly tuft. The forehead is broad and flat, the neck long and somewhat small for the size of the animal. The loin and back wide, but the sides flat and the belly deep. This exaggerates a naturally narrow and not very deep chest, so as to make it appear still less favourable. The legs, speaking of them in the sense of mutton, are large and broad; and the hind quarters generally are better developed than the face. The wool is long but fine, and very suitable for combing, and weighs about nine pounds per fleece. The mutton is good in quality, but the bone rather large. The weight is often 140 lbs.. and in some cases 150 or 160 lbs.

The race are peculiarly suited to the district. They can bear cold, wet, and eastern exposure. Formerly they were fed both winter and summer on grass and a little hay. They are seldom provided with shelter, and not unfrequently the lambs all die; and the ewes suffer from the cold and wet.

The Romney Marsh sheep were to Kent what the Teeswaters were to the counties of York and Durham; and what the ploughing up of the pasture in these counties has done for the Teeswaters, the improvements of Romney Marsh have done for the sheep peculiar to that district. The New Leicesters have invaded both, though they have displaced neither. There are few ordinary farmers in Cleveland, in the Dales, or in the county of Durham, whose flocks have not a sprinkling of the Teeswater; so there are few Kentish sheep which are not considered all the better for a considerable proportion of their native blood. Inured to the exposed district, suited in their development to the herbage, and their wool generally valued in the markets of continental manufacture, the men of Kent did right to keep a considerable amount of the native and hardy blood, suited to the climate as well as suited to the soil.

The infusion of Leicester blood effected a change, possibly for the better, on the old Romney Marsh sheep. It made a finer animal, reduced the quantity but not the quality of the wool, deepened the chest and increased its width, rounded the rib and lessened the bone generally, drew up the belly, and destroyed the tuft of hair on the top of the head; so that it made the sheep altogether a better feeding animal, without destroying its suitability to the soil and climate which it had inhabited for years.

With its other improvements, the cross had also the effect of reducing the period of bringing the animals to market. They were usually three years old before they were sold to the butcher for killing. They are now prime for the London market at two; and as this enables the feeder to turn over one-third more capital in sheep fattening, it is a great advantage, though he has possibly somewhat injured the hardihood of the animal; and it now requires a greater amount of care and skill for the bringing up of the lambs.

Nor has the wool been so far injured as to prevent the breed from being classed among those celebrated for this commodity. The Leicester may have shortened a little, and made the fleece closer set on the body; but it has neither destroyed its fine texture, nor prevented it from standing high in the estimation of the manufacturer.

The *Lincolnshire* sheep is one very much resembling, in many of its characteristics, the races we have just described; and it is very probable that these have had one common origin. To Teesdale we give the decided palm of priority; and it is the easiest thing imaginable to conceive how the constant incursions of the Picts and Scots into Durham and North Yorkshire induced, from time to time, the shepherds, or *sheepowners* more properly speaking, to drive their sheep *southward*, to avoid the destructive and msrauding propensities of these semi-barbarous warfarers. The country could not be laid waste, time after time, without some such effect being produced; and the fact of all this class of sheep being on the eastern side of the island, is somewhat corroborative of what we have hinted.

These sheep stand on high and bony legs. They have smaller faces than the Romney Marsh sheep, and are altogether lighter in flesh. The carcass is large and coarse; the length from the head to the tail considerable, measuring in some cases four feet six or seven inches. This great length sometimes produces a hollowness of the back. The ribs are flattish, and not covered very thickly with flesh. The belly is deep, like the Romney Marsh sheep, and the shoulders so forward as almost to hide the breast. The neck is thick and large, from which hangs a deep and flabby dewlap. The skin is thick, and the flesh often grained. The hind quarters, like those of the Romneys, are full and fat, the tendency being to lay on fat at the rumps. The legs are fleshy and deep. The whole animal appears to be of a somewhat unshapely form, taking the standard of connoisseur taste as a criterion; but when the valued wool covers the animal, the whole of his imperfections are hid. He is one living square of wool, ranging from fifteen to eighteen inches long; and more wool is clipped from the Lincolnshire sheep *than from any English sheep whatever.* The fleece varies from the enormous weight of 12 to 14 lbs., which, when it sells for 15d. or 18d. per pound, is equal to the value of the whole carcass of some of the smaller breeds of sheep. Nor are they far behind in mutton. The wether will weigh from 30 to 35 lbs. per quarter, sinking the offal, or a nett weight of mutton per sheep of 140 lbs.

To the fens of Lincolnshire these sheep are peculiarly adapted, and, apart from their coarseness, are a most valuable breed.

The Old Lincoln sheep were what any other breed (useful in its day) was, before the magic touch of improvement visited it. They gained mutton slowly, but the wool made them valuable to the fen farmer. They required, however, good pasturage. The only part of Lincolnshire, where the old breed remains in its unmixed purity, is the rich eastern marshes, and the low south-eastern portions of the county.

Here, as in the case of the Tees Valley and the Romney Marsh, the Leicester has slipped in. They reduce the size a little; they diminish the length, and revive the accumulation of fat inside, which was a peculiarity of the old Lincoln, and deposit on the outside and back of the animals. Into the lowland flocks a small dash of Leicester is permitted, but in the Wolds flocks there exists fully three-fourths Leicester to one-fourth Lincoln; and perhaps the Lincoln specimens are not the old unimproved breed to begin with. The effect on the wool, as to quantity, certainly depends on the degree of Leicester blood infused. The lowland sheep, when it prevails in a smaller degree, have a large massy frame of flesh, covered and grained with fat. They are compact and light of offal, and are kindly feeders, though they require more food than when a larger proportion of Leicester blood prevails, and cannot either be put on land so inferior, nor on any land in the same average quantity; but for wool they exceed most of the breeds known. Remarkable instances of this are recorded. A wether killed at Grantham, one of an equal lot of twenty-seven, clipped 17 lbs. of wool, and weighed almost 308 lbs.

The sheep are always sold at two shear, and the united clip—the one made as a shearling and the other at two years old—will often average 20 to 25 lbs. When fatted to the utmost extent, remarkable specimens are on record. A wether killed at Holbeach Marsh weighed 300 lbs.; an ewe from Long Sutton, at the Smithfield Club Show, when killed, weighed 262 lbs. in 1846. These instances are given to show the capabilities of these large-framed sheep—not, perhaps, adapted to all localities, but remarkably productive of wool and mutton. Take, for instance, a choice specimen—assume him to be two shear, and his whole produce will be little short of a small cow.

	£	s.	d.
Two fleeces of wool, 24 lbs., at 1s. 3d. . . .	1	10	0
Carcass, say 250 lbs., at 5d.	5	4	2
Total	£6	14	2

When greater prices prevailed, of course the produce of the animal was more; but enough has been said to show that the Lincolnshire sheep, when the least removed from its original stock, is an animal wonderfully remunerative in the shape of wool and mutton.

The Ryeland Sheep.—This sheep is another old, if not original, breed, being resident and produced in the light or *rye-growing* districts of Herefordshire. As the Lincoln are celebrated for quantity, these are for the *quality* of their wool. It is white, and covers the sides of the face; and over the top of the head is a bushy tufty patch. The wool they produce is in great favour for *carding*—superior, indeed, for this purpose, to all other kinds of British wool, and almost equal to Australian, if not entirely so. Hence they were eminently a wool-producing animal; and as the desire for mutton began to extend in the country, and improved turnips cultivated in the light lands enabled them to produce more of that material, the breeding of the true Ryeland sheep has somewhat declined. They appear to have had the same characteristics, as to wool, so far back as 1343, when the price is given as 12 marks, or 160 shillings per sack. Formerly these sheep were protected with almost Saxon care. They were regularly housed at nights in inclement or severe weather, and thus the fleece was preserved in a state of great fineness and beauty. It was also said to be sounder and better calculated for carding. It was of a light quality, weighing only 2 lbs.

The frame of the Ryeland is small, but compact; the bones are extremely small, and the animal arrives pretty quickly at maturity. It weighs about 13 to 16 lbs. per quarter. The head and face, from being covered with wool, has a large and heavy appearance, as compared with the short leg and small but compact carcass of the animal. The ears are somewhat thick and erect; the chest deep, but not broad; the barrel round, but the back by no means very flat. The fat of the Ryeland has a tendency to accumulate mainly on the rump and tail, but not to the degree to interfere with her activity. They are extremely hardy, and are supposed capable of living on less food than any English breed; but they require the food they have to be of a fine quality. They have, like all the old races of sheep, the tendency to accumulate their fat internally. Assuming the correctness of our theory of the large heavy English sheep—in the shape of their types, the Teeswater, the Lincolnshire, and the Kentish, spread over the eastern portion of lowlands—Mr. Herbert's is rendered more plausible, that the Ryeland was the type of an animal occupying the midland longitudinal portion of the country, from the Thames to the Tyne.

The main attempts to improve the Ryeland have been to assist the development of fine wool by crosses with the Merinos. Long ago, Dr. Parry, of Bath, M.D., stimulated by the venerable Bath and West of England Agricultural Society, attempted the ewes with the Merino. The first cross was most successful. The fleece was increased one pound per animal; the texture was finer, and the carcass was considerably enlarged, while the flavour of the mutton was said to be unimpaired. The wool also was said to be as fine as the pure Merino. But they committed the error of nearly all cross-breeders, which has brought crosses into such disrepute. They inter-bred with the crosses between themselves, and hence they deteriorated in three or four generations so much that, in the evidence of Mr. E. Webb Hall and others, before the House of Lords, the deterioration was so great that the Anglo wool was nearly unsaleable.

Having once crossed they should have carried back the cross to the one pure breed or the other; or, what was perhaps better, they should have kept a stock wherewith to cross, and thus have kept a fresh and continuous breed of newly crossed animals. Attempts to improve the size of the sheep have been made by crosses of the Leicester, Cotswolds, and Southdowns; the contrast, however, was too great. The results were destruction of all the peculiarly desirable properties of the Ryeland, as well as the obliteration of several of the others; and the breed has been rapidly abandoned for more profitable mutton-producing kinds of sheep.

The *Shropshire* sheep may, for all practical purposes, be considered as a climatic variety of the Ryeland. At the early period before referred to (1343), it is clear that this breed was very valuable for its wool. The produce of the Shropshire sheep exceeded even the Ryeland by two marks per sack, making the large sum of £9 6s. 8d. per sack, the dearest of all the English wools mentioned by Anderson. This breed inhabited a rye-producing district, probably the Morfe-down, consisting of about 4000 acres of common land near the Severn, which yielded a short and stunted, but fine grass. The colour, however, shows them to be in some degree distinct from the Ryelands, though possibly of one common origin, and a part of the stock alluded to by Herbert. The *hair* of the face and legs is speckled and grey, and they have a sort of short undeveloped horns. The fleece is about the same weight as that of the Ryeland—2 lbs.; but the staple is particularly fine. They are seldom kept till more than five years old; and the ewes will not weigh more, when fat, than 9 or 10 lbs. per quarter. The wethers will weigh 13 or 14 lbs. Modern tastes and habits will not allow, however, of sheep being kept for 2 lbs. of wool and 40 lbs. of mutton; and hence the changed demands and wants of the population are fast banishing all these original breeds of animals,—breeds of a class comprehending the promotion of both wool and mutton supplying their places.

The *Wiltshire* sheep is the largest of the fine wool-bearing animals; and the wethers will weigh, when fat, 70 to 100 lbs.; though the latter is, perhaps, an extreme weight. The wool is not very short, but extremely fine, and weighs 2½ lbs. per fleece. The sheep is horned, the horns rising close together, and bending backwards and downwards, close to the head of the animal. The hair on their faces and legs is perfectly white. They have large bones, and are slow feeders. They are very voracious, though they make little flesh in proportion to the food consumed. Their bellies are destitute of wool; the head long; the nose somewhat arched; and the nostrils open, wide, and prominent. The fore quarters, especially the breast and shoulders, are light; and there is a good deal of dewlap. The hind quarters are better developed, and the saddles and legs very good. The back is black in the middle, and the shoulder points project upwards. They are large-boned and clumsy sheep, and are only preserved in their unimproved and native form on a family farm near Hendon, where the stock is kept pure, under the provisions of a will which permits the farm to be held on this special condition.

These Old Wiltshires were unprofitable and unfashionable sheep; they possessed neither paying carcasses nor symmetrical forms, and have given way to the Downs almost entirely.

The *Berkshire* is a smaller sheep, producing fine wool.

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CHAPTER V.

MUTTON-PRODUCING BREEDS.

Abstractedly, the body of the sheep may be considered as a machine for converting vegetables into a more concentrated, invigorating, and solid food. It collects together the scattered vegetables, assimilates the flesh-producing portions of these plants, and stores them up in their proximate forms. Thus it relieves the human stomach from the soverer work of separating the more *fibrous* portions of plants, which possess powerful organisations, and large quantities of water. The chemical principles of vegetables and animals are in general intrinsically the same; but as regards the *state* of the one and the other they are essentially different.

The sheep is also a machine which converts the raw material of man's food into that kind of flesh which, from the fineness of its texture, is perhaps the most readily digested and assimilated; so much so, that mutton and mutton broth are amongst the first solid food which the medical faculty will allow to the invalid.

Necessity selects the kind of mutton which is the cheapest for a family. That which affords solid food for the hard-working head of the family, will supply a plentiful portion of gravy, for making the potato more palatable and more nourishing to the growing and less actively employed members of the family. Hence the Leicester, the Lincoln, and the Cotswold, are the favourites. *Luxury* takes those which have the finest grain, and the most delicate and exquisite flavour, ond chooses the Highland black face, the Southdown, or the Welsh mountain breeds; so much so, that the demand for these smaller animals is so great, as to make the smaller weight of more absolute value than the larger. In the larger also, the tendency seems to be to grow both wool and mutton in a considerable degree. Hence we have selected, as the test of classification, the market value of the mutton, in defining the mutton-producing breeds.

We have seen how native breeds deposit their fat as well as their flesh; for both are necessary to the English notion of mutton. The race which deposits it on the hind quarters is very numerous—some depositing it on the rumps, others on the tails. The characteristic of the native English sheep appears to be the depositing of it on the *flanks*, as will be seen from the description of the wool-producing breeds mentioned in the last chapter. The progress of the improvement, however, has more than developed the fat either equally all over the body, as in the case of the Leicesters, or divided it between the layers of the muscles, as in the various breeds of mountain sheep, and the Southdown. The reasons appear to arise from the physiological points and natural history of the animals, which are alone adequate to account for these peculiarities. The race of sheep, of which the Leicester is a type, are a set of *still* animals. They are luxurious and sluggish. The deposit of fat is not worked in, as it were, by the action of the muscles, but accumulates under a *skin* peculiarly soft, yielding, and elastic. The mountain breeds (for into such we shall presently resolve all the favourite mutton-producing breeds of sheep), lead an active, vigorous life; and thus the fat is deposited between the muscles, in order to lubricate them for the performance of their duties. Hence we have marbled mutton, the fat and lean being regularly dispersed; and the gravy is kept in the grain of the meat when cooked; while in the other case the fat fries out, and only bastes the joints while cooking, thus affording more dripping for the cook than gravy for the master,

The process of mutton-making is thoroughly English. *The internal formation of fat is the first process in all the English sheep.* A network of fat is first formed, which envelopes the intestines, and another mass accumulates on the kidneys. Thus it begins to be deposited on the rump; and the first symptoms are the sides of the rump rising, so that the backbone cannot be felt. They begin to be *cloven.* This progresses gradually on the back, until the backbone is lost; and, instead of the protuberant bones, there is a crevice along the line of the back to the shoulder, or possibly to the juncture of the neck. Then it begins to be accumulated on the sides, and proceeds towards the flanks, and forms on the breast, shoulders, and brisket, thus showing how gradually the whole tendencies of the sheep, in all climes, are brought out to make a fat-mutton English, or rather British, sheep. When all this is accomplished the sheep is fat, or *prime.*

The *Blackfaced* or *Heath Sheep* takes the lead in the epicure's list of fine mutton-producing sheep. A four-year old Scotch wether, as they are usually termed (though a similar breed inhabits the whole of the range of mountains known as the "Backbone of England," as well as the Scottish mountains), if killed fat, and the mutton kept from two to five weeks in winter, until it begins to be covered with a green mould, is one of the finest dishes an epicure can desire.

The mutton is very small in the grain, dark in its colour, not very high flavoured, and extremely tender. It may be considered a native of the Highlands of Scotland, and is a wild, active, and rambling sheep. Material improvements have of late been made, not by crossing, but by selecting the best, and breeding from these exclusively, until the once goat-like, shaggy, ungainly animal is more symmetrical, tamer in disposition, and finer, though equally long, in the wool. The usual weight is fourteen to eighteen pounds per quarter; but Mr. Stephens mentions the case of an animal of this breed, shorn at the Perth meeting of the Highland Society, which weighed forty pounds per quarter—an enormous weight for any sheep, but especially so for a small wild mountain breed. It may be supposed, however, that this was quite an exception. The Gillespies of Lanarkshire were the great improvers of the breed, and could show very beautiful specimens. The Messrs. Plummer of Laidlaw slaughtered in Edinburgh, in 1850, about two hundred of these improved animals; and they averaged twenty-five pounds per quarter, some reaching thirty pounds.

The peculiarity of this sheep is its hardiness. It will live on food the most unlikely; and for *growing* it is usually left to shift for itself amongst the heather and furze; and when unmolested he picks up a subsistence unknown to a finer race. Thus he grows up at very little expense, either to his master or any one else, until he is taken to a better pasture, or to turnips, for the sake of being fatted.

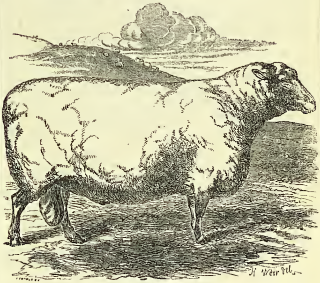
The hair on the face and neck of these sheep is usually black, though sometimes approaching to grey, and a little before shearing time somewhat brown. The head is fine, and slightly Roman, while elegant and graceful horns grow from each side, usually bending backwards and downwards. The specimens on the heads of some four-year old wethers are really beautiful. The heads are broad, and the backs straight and broad; the chests deep, and the legs straight and fleshy. The wool is long and pendulous, and convoluted in the most graceful ringlets. The eyes are bright, full, and expressive of *life*. The carcass is full and round-barrelled, having well arched ribs. The lines down the hams and the breast are straight and perpendicular. The neck is fine and clean.

The lean Highland sheep are usually purchased at Falkirk trysts, where teeming myriads of animals clothe the moor,—a sight calculated to bewilder the observer. As many as 80,000, and even 90,000, are sometimes shown at the October tryst. Twenty thousand is a common number at the other trysts. About half this number are wethers of the shear; the remainder are two-year olds, for further picking on the moors, and for store or for feeding, and a few rams.

The year-old wethers are either purchased there, and put to turnips to fatten, and sold off, or killed in March or April, or they are run on in winter in any low pasture with rough grass, and fattened in the summer of the following year on grass. During the winter these will live, and even improve, on grass of a very inferior kind; such, indeed, as every other animal will refuse; and if put somewhat thinly on the ground, will manage to get through the winter. Many persons imagine, that four or even five years are absolutely necessary to the full mutton-development of the black-faced sheep. This is not the case. Heather-fed sheep, fed in the second winter after they are lambed, are, when rapidly fatted, as prime and ripe as they can be at any subsequent period. Mr. William Bogue had a two-year old wether sheep slaughtered, which weighed twenty-seven pounds per quarter, and this, Mr. Dickson shows, is by no means an improbable or uncommon weight, for he gives an instance of several live animals which weigh from 117 lbs. to 187 lbs.; and these would average twenty-seven lbs. per quarter when killed. Mr. Bogue states that for fattening they exceed the Southdowns which he had also in his possession; but it should be borne in mind that this was at Skateran, a situation too cold and bleak possibly for the Southdowns. There is great difference, however, it must be admitted, between those heath-fed black-faces and those which have been bred up on more genial soil. The heather sheep requires to be kept to a greater age before fattening. The same may be said, indeed, of any kind of animal whatever; but Mr. Bogue, who feeds so successfully, and at so early an age, never allows the lambs to lose their first lyre, so that no uncommon waste has to be replaced by the feeder.

The great secret in keeping the black-faces is not to overstock. They will bear a large amount of cold and wet, and will live and thrive on a very poor pasture; one, indeed, on which, perhaps, no other animal will thrive or grow they will fatten upon; but they are so seldom tried even with this, that age has to make up what neglect has previously done, that it is absolutely necessary to keep them to a period of their lives beyond that, perhaps, of almost any other sheep. Heavy stocking will nearly always make the difference between good and bad produce—it will diminish the size of the sheep—throw him back in his feeding, and the breeder and the feeder will be a much greater time in having their produce ready for the market.

The *Southdown Sheep* is in England what the black-faced sheep is in Scotland, being far the most popular as a mutton-producer, at least for the tables of the rich. Nor can there be mentioned a breed which has undergone more improvement in the last few years than these beautiful sheep. As a style and class the Southdown is unique. The



THE SOUTHDOWN.

hair on his face is black or brown, short, even, and fine. The wool is short, close, and remarkably fine in texture and quality. It lies thick over the whole body, and has, when touched, a peculiarly velvety softness, with all the elasticity of a piece of India rubber. The top of the head is free from wool; the countenance is fine and placid; the eye is full and expressive, but mild and gentle, and somewhat large and prominent. The ears are small, falling backward and little upward. The hair is small, and the legs short, especially from the knees to the feet. The breast is full, round, and prominent, as well as moderately wide; the neck thick and short, but free from loose fleshy skin. The top of the back is straight and flattish, but not remarkably broad; and the side ribs are moderately arched. The legs are full, but gently rounded, and tapering downwards; and the belly is nearly straight, but a little tucked in behind the shoulders. The wool is remarkably fine, and is the only kind of English wool altogether suitable for the finer class of cloths. They are hornless, and comparatively hardy, occupying the downs of Dorset, and now gradually spreading into Norfolk, Yorkshire, Hampshire, Kent, &c. In the London market, where their mutton is considered superior to all other kinds, they are in great request.

We have just described the present improved Southdown. The older and unimproved breeds were low, and light in the fore quarters, but backed with good saddles and legs. The improvements have not gone on by crossing from other breeds, but from selecting the best, and breeding carefully from them. To the Duke of Richmond and Mr. Ellman we are particularly indebted for this improvement. And while the symmetry and points of the animal are so much improved, the fine quality and grain of the mutton, the equal distribution of fat and lean, the marblings of the flesh, the bright dark mutton, and the internal fullness of tallow, are all most fully sustained. The early maturity of the breed has been attained; the fattening has also progressed; and the wool is made longer, being about four inches, though not yet long enough for combing. The fleece usually weighs from two and a half to three pounds; and the average weight of the carcass may be taken at eighteen pounds, though the improved breed will often weigh from twenty to twenty-three pounds per quarter.

This sheep requires a dry chalky limestone or gravelly soil, with fine short herbage, on which they will thrive, and accumulate their peculiar mutton better than in more luxuriant lowlands. They are peculiarly suited, also, for folding or stalling, to which circumstance we shall have hereafter to allude. The ewes are prolific breeders, two bearing twins to one being single; and the draft ewes are usually sold off, at four years' old, to feed in the turnip districts of Norfolk and Suffolk.

The care of the sheep is nowhere better understood than by the Sussex farmers, who house and shelter the flocks in severe weather, at and near the lambing season. When the lambs are a-foot, they are well provided with shelter, and their dams with nourishing food. The Southdown is a sheep remarkably free from disease, especially the sturdy and the rot.

With the uses of the Down we shall deal when the subject of breeding is considered; in the mean time, we shall consider the

Cheviot Sheep,—which is another of the hornless breeds of mutton-producing sheep, little inferior to any of the above, either for hardiness or for valuable mutton. It is hornless, and has a white face and legs, remarkable for their snowy whiteness, somewhat resembling the cover of the hills during the larger period of winter. The striking characteristic of the Cheviot flocks is their extraordinary likeness to each other, how many soever there may be.

The fault of the Cheviot sheep is narrowness of the back, ribs, and shoulders, from which arises their incapability of carrying a large accumulation of mutton. Judges of the best kind, therefore, *choose those with broad faces,* because this characteristic is indicative of a broad bony development.

In selecting lambs, or even fattening sheep, the hand of the grazier grasps the back-bone, over the kidneys, and judges by its broadness whether it is sufficiently capacious to carry the complement of flesh and fat which he calculates putting upon it.

The eyes of the Cheviot are small, but prominent and lively. The body is long; the fore-quarters somewhat light; the legs clean, and small turned; the feet thin; the wool close and fine, but neither so soft or so elastic as that of the Southdown, but too thick for combing. The improvements in the sheep have added a little to the breast and shoulders; neither have they diminished the feeding qualities, or injured the wool. The neck and shoulders are fuller. The breast has become slightly prominent, but still narrow. The back retains its narrowness, but the fall behind the shoulders, common in the old breeds, has been filled up. The ribs are still flatter than either the Southdown or the Highland. The animal unites the fat with the muscles, and is, when fat, well covered internally with tallow. They are remarkably hardy animals, and live on very poor and stunted food growing on the mountains of Northumberland. In storms of snow, they seem peculiarly calculated to forage for their food, and the snake-like head, as it peers out, seems well calculated for wedging amongst the deep snows which often cover its native mountains for long successive periods. They also bear travelling and driving better, perhaps, than any other kind of sheep, and are sometimes driven very great distances.

So much hardiness of character has induced many far-seeing Scotch farmers and breeders to adopt them on the Scottish mountains, and they are to be found successfully bred and thriving on the hills of Sutherlandshire; while they have also an extensive range on the Yorkshire hills.

The Cheviot mutton is smaller in the grain than the Leicester, and is a very tender, sweet, and delicate kind of flesh. It is neither so bright nor so high-coloured as that of the Southdown or the Highland, but it has somewhat of its high flavour, and the fat is more dispersed and less luscious than that of the Leicester. They are now sometimes fatted at one year old; and the flesh resembles in appearance, when well kept, the Welch mutton, but it is more tender, and not so high in flavour. The bags will weigh 14 lbs. or 15 lbs. per quarter, and the two shear-wethers will sometimes weigh as much as 22 lbs. Instances are mentioned where they have been made to weigh 25 lbs. per quarter, but these are extreme cases.

The recent improvements of the Cheviots are chiefly owing to a mixture, very cautiously infused, of the Leicester blood. But this requires great care. The Leicester is a tender and delicate sheep, unsuited to the snow-clad moors of Northumberland, of Westmorland, and of Scotland; but while a single dash of Leicester will improve the frame, lengthen the wool, and increase the feeding propensity, it will not be so severe (if the impression be carried rapidly back to the Cheviot race) as to weaken materially the vital power of the animals.

The question, when Cheviot and when black-faced sheep should be selected for breeding and rearing on mountain pasture, depends upon the following criteria :—

When the produce of the hills is simply black furze, or heather, the black-faced Highland sheep will be preferable. When the grass is green, though ever so poor, the Cheviot will pay a greater amount of profit.

The following, taking this principle, will be about tho comparative merits of the two breeds :—

BLACK-FACED.	CHEVIOT.
Wool inferior	Wool superior.
Mutton superior	Mutton inferior.
Hardiness equal	Hardiness equal.
Maturity later	Maturity earlier.
Feeding less rapid	Feeding more rapid.
Less mutton	More mutton.

The balance on the whole, on suitable lands, seems to be decidedly in favour of the Cheviots.

The *Norfolk Breed*, though fast disappearing before the Leicester, must be considered as a mutton-producing race of sheep. In some respects they resemble the black-faced Highlands; having the same coloured faces and legs, with full bone, long spiral horns, long bodies, high back bones, flat ribs, rather narrow loins, and very light and shortish wool. The mutton, however, is of that fine rich flavour which is found to be the quality of all wild and semi-wild animals. The Norfolk sheep is of a very peculiar roving disposition, and will leap over the ordinary fences; and their long residence in the county is doubtless one reason for those high banks on which the fences are generally found planted. And this has probably given rise to the saying, that if a fence had to be erected on Snowdon, they would raise a mound upon the hill on which to plant it.

These sheep will fatten at two years' old, and are excellent travellers. They often weigh from 16 to 20 lbs. per quarter, and their mutton is of a fine-grained quality. Owing to the natural wildness of these animals, they are now mostly fed on the large open heaths, which, strange to say, are still prevalent in Norfolk, notwithstanding its fine climate, and general capability of improvement. When fatted they are usually folded.

The principal value of the breed, however, is in their haunches of mutton, and their deer-like graceful heads and horns. The mutton, when long kept, perhaps more closely resembles venison than any other breed. The horns are nine or ten inches in circumference at the base, and as much as thirty-six inches long.

The *Welsh Sheep* is the most luxurious of all the mutton-producing race, owing to its being so high-flavoured, fine in the grain, and small. They are the very converse of the Lincolnshires, and are a truly Lilliputian breed. They are the most remunerative of any kind of mutton sold in the London market. The two haunches are usually cooked together, undivided, and present a most uncommon appearance. The wethers are killed at four or five years of age, and will then weigh, when fat, only eight or nine pounds per quarter. The ewes usually weigh two, or even three, pounds per quarter less. The sheep, when alive, is a goat-like animal, somewhat resembling the gazelle of the Nimroud sculptures. The ram has two crumpled horns, rising upwards, and falling backwards again to the neck. The ewes are usually hornless. The neck is long; the shoulders high and thin; the breast small, narrow, and backward; the legs and loins full and broad. The ribs re flattish, and the belly a little depressed; the tail long, and bushy towards the extremity, nearly down to the middle of the hind legs. The bones are remarkably small. They are the most active and sure-footed race of sheep we know. They are essentially wild in their habits, and clip about two pounds of somewhat fine wool. The ewes are sometimes milked by the Welsh farmers; but this pulls them down, and is very injurious to them. Some persons clip them twice; that is to say, they shear them at the usual time in June, and again take off part of the wool from the fore-quarters in the month of October, alleging that they are less liable to have it torn off by the furze and briars, and more able to forage for their daily supply of scanty herbage amongst the bushes in winter.

Dorsetshire Sheep.—With our notice of this breed we shall close the present chapter. Though not remarkable as a mutton-producer itself, it is used for the purpose of supplying London with that form of it called *lamb.* It has the peculiarity, common to no other breed, of *breeding twice a-year.* The mutton, however, is fine-grained, and well flavoured. The Dorset sheep is not unlike the Merino at the first blush. It has a fine, small muzzle; face and legs covered with fine hair; and these, with the wool, are completely white. The horns are large and spiral in the male, exactly resembling those of the Merino; and in the female they are bent downwards by the side of the face, describing nearly a circle. The wool is fine and short, and amounts to eight or ten pounds per animal. The breast is full, but narrow, and by no means deep; the shoulders light; the neck rather long; and the legs the same, but light boned. It stands taller than the Southdown. The hind-quarters are heavy, and the tail long and bushy at the end. The ears are long, and extend sideways; the eyes full, prominent, and expressive. The wethers are sold for the butcher at three years' old, and weigh from eighteen to twenty pounds per quarter. They are good feeders; the mutton is well marbled; and they travel well to market.

The great peculiarity of the Dorset sheep appears to be, that while other breeds receive the ram only at one and the same season, the Dorset will take him all the year round, and even while the lambs are suckling. There is thus the power of supplying lamb at any season of the year for the pampered appetite of the epicure; and vast sums are thus realized by those who keep them for the purpose. Nor is this peculiarity one which at all applies, as might be supposed, to the mild climate or favoured pasturage of Dorsetshire. The breed possess the same peculiarity in all parts of the country, even in Scotland; though it must be obvious that the rearing of lambs at the period of mid-winter is far more likely to proceed favourably in the mild and genial south-west of England than in the colder and more northern climes.

The ewes take the ram in May, so that they will produce in October; and the early lamb at Christmas, in London, is obtained from this late produce. These lambs are house-fed, in a great measure; though the general mildness of our recent winters, and the chilliness of our springs, have rendered the rearing of our winter lambs more easy and certain than that of our ordinary spring lambs. The lambs are usually dropped about Michaelmas, and then put into a house or shed; while the ewes are partly allowed to be with them, and partly to roam and feed, either permanently or temporarily, in walled crofts, which are preserved full of grass, for the purpose of affording them a full supply of the most succulent food. In addition to this, turnips, rape, cabbages, &c., are added, which, by the most scientific farmers, are cut or chopped; and troughs are also placed, by which the ewe is supplied with cake, oats, peasmeal, or such mixtures and variety of food as she may be disposed to take, or which may be had with the greatest facility, or be the cheapest in the market.

The lambs are laid in dry warm houses, well littered with straw. They are also supplied with lumps of chalk to lick, to keep off the scour, to which they are very liable from the richness of the mother's milk. At first the dams are allowed to suckle them three or four times a-day; but as they grow older, and the crofts fail, the ewes are driven farther away to pasture, and they return to the lambs only at night.

When a lamb dies the ewe is still retained to milk the rest in turn, and stands are made with stocks, into which she is fastened until her udder is thoroughly drained. This takes place before each lamb is allowed to suck its own mother; and thus the loss of a few lambs is often no great injury, the whole stock deriving a larger proportion of the fattening milk.

The price at which the lambs are sold will vary, but sometimes they produce as much as £3, though £2 is possibly nearer the average, which is a large sum for the care and small period of time (about eight weeks) during which the lambs are being fattened.

When *grass lamb* is intended to be produced, the ewes are put to the ram at a later period, so as to have the lambs dropped about March, and only partial shelter is provided. The ewes are kept in the same liberal manner. The lambs have more liberty, and are much less trouble to their owners. Ten or twelve days after lambing, kept as they are on food so highly nutritious, they will again often admit the ram, and thus will bear lambs twice in the year. Of course, those which are house-fed have by far the best chance of successful breeding, as the second time of producing the grass-fed lamb would be an inconvenient portion of the year, when the young would be likely to suffer damage from flies, &c.

We shall close this chapter with a slight notice of a very ancient and singular race—the *Herdwick breed* of sheep, common in the mountainous districts of Cumberland and Westmoreland. These sheep are very small and lively. They are polled, have speckled faces and legs, wool short and rather fine, weighing about two-and-a-half pounds per fleece. The ewes weigh six to eight pounds per quarter, and the wethers perhaps eleven pounds. In winter they scratch down to the breast through the snow, and live on a small amount of very poor food. They are said to be more hardy than almost any other; and rams of this very diminutive breed are sometimes purchased to improve the *hardiness* of other breeds, though they must also influence their size.

The first samples of this breed, we are informed, were found in the wreck of a ship early in the eighteenth century; and from the few then saved the race has spread throughout the higher-lying parts of the northern counties of England. Their original country is said to be Scotland, or some of the islands north of it; but as no corresponding breed now exists there, the whole relation may be doubtful.

A very remarkable characteristic of the breed is, that they have fourteen ribs instead of thirteen, the number possessed by all others.

The wethers are killed at four or five years old, and weigh about ten or eleven pounds per quarter when fat. They seem not only to thrive best on their native pastures; but when the ewes are driven away they will invariably return at lambing time to their old quarters, however distant they may be. This shows a remarkably wild instinct, and is of the same character as that of the black-faced Highland sheep,—flocks of which will sometimes actually swim across the Firth of Forth to find their way to their native mountains.

The ewes, like those on the Welsh mountains, will breed for fifteen or twenty years, and are always kept as long as they will continue to do so; the sales being made of the fatted wethers. When killed at home, the legs are usually cured and dried, the same as pig's hams; and it is jocosely said that the inhabitants of these uplands never eat mutton but when they find a fallen sheep, which, when they do, they shake by the leg, and if it drops to pieces it is rejected, but if not, it is carried home, dressed, and eaten. This will certainly be *gameish* enough for the most depraved palate; but it is remarkable that the strong heath-like flavour is the one which the epicures chiefly seek after in purchasing their mutton in the markets of large towns.

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CHAPTER VI.

BREEDS PRODUCING BOTH WOOL AND MUTTON.

All breeds of English sheep produce both these necessaries of life; though some, as we have seen, secrete and produce more of the one or the other, suited, in a peculiar degree, to the wants of the manufacturer or of human sustenance. Luxury demands peculiarities in both. It will be clothed in dresses, fine and soft, to please the eye and gratify the touch; and more than warmth is her object. It will not be satisfied with the quantity of food; it must be aggregated on particular joints, and must be of a peculiar flavour. Hence luxury selects those kinds of animals which feed on the most worthless food. Thus extremes will sometimes meet; and the extreme of luxury be met by the extreme of want and privation.

But these are animals which, though unfit to be placed in the category of those ministering to epicurean taste, will minister extensively to man's necessities, and manage to secrete large *quantities both of wool and mutton*; the one not so fine, perhaps, as luxury requires, and the other not so highly flavoured; but both well suited, in a very high degree, to the real wants of mankind.

Foremost in this list stands the *Leicester Sheep*, or the *new Leicesters*, a name by which they are better known since the improvements of Bakewell. The original Leicester sheep was large and bony. It had the type of the Teeswater, the Lincoln, and the Romney Marsh character, or generic qualities representing the whole combined. It was a large heavy sheep, with disposition to feed favourably, but with much heavy grossness about its composition. They were doubtless identical with the type of sheep so common to the district of the long-woolled and large carcassed animals; and which, probably, the Scottish invaders once took from the valleys of the Tees. They were flat-sided, heavy-boned, long-legged, coarse in the pelt and offal, with long excellent combing wool. The rams would weigh, when fat, 40 lbs. per quarter; and the fleece would weigh 13 or 14 lbs. On the rich Leicestershire meadows they would be fatted at three years old; yet not to the weight we have just mentioned; though a four years old sheep might attain that weight.

THE LEICESTER.

It was on these animals that Bakewell began to experiment, with a view to improvement. Bakewell and his flock were first heard of in 1760, when he commenced the system of letting rams, as distinguished from selling. The usual course was for the farmers to save the best of their several flocks, and reserve them uncastrated, as male lambs. Bakewell began a letting system; but so little was it liked, and so little was thought of his rams, that he let one in that year for the season for only sixteen shillings.

Bakewell stands alone in merit as an improver. He took the native sheep, reduced his size, gave him small offals, induced him to lay on flesh and fat all along the breech, the sides, the shoulders, the flank, and the neck. He opened his wool, and also reduced it in weight, and a little in length. He increased the tendency to lay on fat in proportion to the food consumed, and made the animal take on fat a year or two earlier at least; by which he enabled two or three animals to be fed where one only was fed before. And this was not a fitful temporary change in the animal. It was permanent and indelible; and the same breed of sheep has, for nearly a century, not only maintained its position, but has been used with more or less success to improve nearly every breed of sheep in the United Kingdom, and, at the same time, has more or less displaced almost every other breed.

How did Bakewell accomplish these objects? This is a secret. He died without revealing it; and we have to guess at the probabilities. The breeders of the Teeswaters, of the Downs, and of Lincoln, all claim the breeds as the source of his improvement of the old Leicester stock. They allege that he might reduce the bone and frame by a simple dash of the favourite blood, and thus obtaining a firm superstructure, breed in and in, until it was indelible. But this is very improbable, as it is not likely that any *cross* could have so firmly taken possession of a race, and made them *all alike*. It is rather an indication of *purity of breed* than of any cross whatever. He doubtless selected those animals which corresponded with his ideas of what were the best, with light offals and a tendency to feed, and that exhibited early maturity and very unnatural forms; for these are the invariable concomitants of the state of things above referred to: and he had plenty of opportunity of selecting those which suited his purpose.

It seldom happens that one great man discovers any new fact or principle in science alone. Discoveries, according to Providential arrangements, seem to be made in different places at once. Mr.

Joseph Allom, of Clifton in Leicestershire, who rose from the plough-tail, by his mind and energy, to be an extensive farmer and breeder, was known to select and purchase choice ewes from all parts of the country, chiefly from Melton. He had a breed which were great favourites before Bakewell was heard of. Specific characteristics we cannot very easily define. Mr. Youatt slurs even Mr. Allom in a note; and in the text says, "up to this period" (the middle of last century) "very little care had been bestowed in the breeding of sheep." Mr. Marshall goes to the other extreme, and says that the origin of Bakewell's improvements are due to Allom. The truth is probably between the two. Allom's stock might be made available to Bakewell's purposes; and his practice might set the latter to work, in more zealously improving the breed.

Another cause was also in operation towards the same end, and doubtless gave another opportunity for Bakewell's selecting his specimens to improve his breed. In 1747 there were some successions of bad seasons, which so operated on the succulent grass of Leicestershire as to sweep off nearly the whole of the sheep on the lower clay soils of that county. This banished the more wealthy farmers from the district, and they had to take refuge on the wolds of Yorkshire; and then purchased some small horned fine-bred sheep, for a supply to their decimated flocks. The trade of jobbing thus commenced, and it is said that Bakewell employed the jobbers who brought down, from time to time, these Yorkshire wold sheep, to allow him to call out the best before they offered them to the farmers. He thus obtained compact, square, rapidly-feeding animals, and persevered, year after year, in selecting the best, in his judgment, from his own flock, until he had obtained the celebrity which has handed down his name as the greatest improver that ever lived; and the once *new* Leicester sheep has become *the Leicester* sheep; so completely has it eaten out its progenitors.

Bakewell began to let, as we have seen, at the moderate price of sixteen shillings. Allom had before obtained the large sum of three guineas for the use of his superior ram lambs. In 1780 the former realized ten guineas for the loan of a ram for a season, and in six years more he lets one ram for 300 guineas. After this his celebrity rose to its height, and the demand for his stock became quite a mania. One hundred guineas was considered a small price for the loan of one of his rams. Three to four hundred guineas was by no means an uncommon sum; and on one occasion he had ten guineas per ewe for every one served by a celebrated ram, which he made to serve 120 times. He let one ram subsequently for one thousand guineas; and as his sale ewes were always put on lowlands, where they were sure to become the victims of rot, he managed to keep his female animals from spreading; and, indeed, would allow no access to his breed but through the rams which he let, at the enormous sums we have named.

So much for the origin of the Leicester. He is, indeed, the type of a sheep suited to the grazier in every respect. The head and legs are covered by very short fine hair, so thin and fine that the skin is partially visible through it. The colour is whitish, but not the snow-white of the Cheviot; but it has a bluish tinge, and is as soft almost as down. The head is fine and small; the eyes very full, but quiet in expression; the ears thin, fine, of moderate size, and tending backwards; the neck rather short, fine, and free from all flabby skin or flesh, and thickening as it proceeds to its junction with the shoulders, but so forward that the prominent breast is in a line with it, and regularly filled up by the base of the neck. The breast is broad and full, as well as forward. The back is perfectly straight, from the setting in of the tail to the top of the head; the latter not rising upwards, but horizontally set on. The ribs are arched; the shoulders round and thick. The legs are broad, so as to give a table-like appearance to the back of the animal: they stand wide apart, and are somewhat short. The ribs extend well towards the legs. The quarters are long and full. The wool is somewhat long and spirally curled, set on very open upon the skin, and hair extremely white and soft, though strong. The inside has not so much development of fat as in some breeds, but it is laid on externally in greater quantity. The weights may be taken at 25 to 30 lbs. per quarter; the wool 7½ to 9 lbs. each.

As a *turnip feeder*, the Leicester is, perhaps, the most successful of all breeds of sheep. The fat is in greater quantity, aggregated on the surface, than, perhaps, any breed whatever; and it will lay on as much fat, for the food consumed, as any other kind of sheep, if not more. We refrain, however, from entering into comparative feeding qualities at this part of the treatise, as it will be subsequently investigated; but the great qualification of the Leicester is his power to assimilate and convert the green crops into fat and flesh.

Perhaps a better proof of the value of the Leicester could not be afforded, than in the fact that they have superseded a vast proportion of the sheep of this country, from every circumstance of pasturage and climate, and established themselves in their stead; but they have also been used to improve the desirable points of almost every breed, which still at all keeps its ground.

The early maturity of the Leicester, and his disposition to accumulate fat, equalled only by the short-horn amongst cattle, is certainly unequalled by any other sheep in existence; and it is the only sheep which can, with any degree of success, be fattened at one year old.

The Cotswold.—This breed stands next, perhaps, to the Leicester, as a producer of mutton and wool. It is larger than the pure Leicester. It has a large frame and heavy fleece of wool. It stands high in estimation in its localities, as a rapid fat producer and a good grower of wool. In hardihood it exceeds the Leicester; in the prolific character and milking qualities of the ewes it is superior. They will also bear inferior pasture, though a larger sheep, and may be considered as one of the oldest and primest breeds of sheep in the kingdom; for while the new characteristics of the Leicesters have only been developed at most a century, they have been stationary in Gloucestershire, as a standard long-wooled sheep, since the time of Queen Elizabeth; and even by Markham they are described as long-wooled sheep. They are certainly deficient in early maturity: for though sometimes fed at fourteen or fifteen months old, they are more frequently two years before they are really prime or "ripe." Originally they were like most of the early and indigenous breeds of sheep bred on the uplands, and kept till two years old, and then fatted in the valleys—especially the vale of the Severn. But when the alternate system of husbandry became common on the Wolds of Gloucestershire, they were put to breed and fatten there mainly by the seeds and turnips.

The tendency of the Cotswold is to accumulate fat upon his back. The breast is not so wide, deep, or prominent as that of the Leicester. The bone is larger and the sides flatter, nor are the shoulders and the legs so broad and prominent. The handling, too, is different. The fat and flesh seem laid in the back, in an accumulated and unyielding mass; whereas the Leicester has the soft yielding elastic firmness which reminds you of substance, and at the same time is pleasant and soft as velvet. This may arise from the fineness of the pelt. The Cotswold, on the contrary, has a thicker pelt, and the wool is more straggling at the edges, and more matted near the skin. The head is white, and so are the legs; while the small ears fall downwards and outwards, and the top of the head is a mass of soft bushy wool. The weight of the animal will sometimes reach 28 lbs. per quarter; but 28 to 30 lbs. will be a nearer average for two year old sheep. At a year and a quarter they will, when properly fatted, be found to yield 19 lbs. per quarter, and sometimes get as far as 20 or 21 lbs.; and will yield 8 to 9 lbs. of wool, which is fine and light in proportion to its bulk, but has not the open grain of the Leicester.

The gentle and gradual infusion of a little Leicester blood is pretty general amongst the most celebrated and extensive flocks; otherwise there is longer wool, less early maturity, more hardiness, more bone, and somewhat lighter fore quarters. Still the Leicester alloy is not excessive, and occurs perhaps in a very remote degree. The taste for more is probably increasing. Still the sheep shown at the agricultural meetings are sometimes monsters. We certainly saw one at the Cirencester Meeting which could not weigh less than 43 lbs. per quarter. He was said to be little more than two years old. The sheep is still and quiet in his habits, and is one of the best kinds for carrying out the board or hurdle feeding. Mr. Mechi selects them for feeding in his boards, where we saw lambs of ten or eleven months old fit for the butcher, and weighing 18 lbs. per quarter at least.

Of the crosses of the Cotswold—a sheep more capable, perhaps, than any other of giving size and hardihood to a flock which has too much "blood"—we shall speak more freely in the chapter on breeding.

The Dartmoor Sheep.—We are now coming rapidly to the sub-varieties of sheep; and, in classing this amongst the sheep valuable both for wool and mutton, we must be considered as combining not so much quantity as we have previously done, but the quality of both. They have some resemblance to the Dorset in appearance, but are much less in size and better mutton; while they are so hardy as to live on poor stunted heath, and pick up a subsistence on inferior land. They are white-faced, horned, small, and snake-like in the neck and head; very small-boned; weigh 12 lbs. per quarter, and bear mutton closely resembling venison. The wool is soft and short, but not very fine. It is used in the manufacture of livery cloths at Leominster. When fed on better pasture, they grow to a larger size, and produce a finer wool.

The Exmoor Sheep is very like the Dartmoor in its conformation and character, but of a still smaller size. They have hair under the chin, like the goat; and are, if possible, more wild than the former-mentioned race. Their mutton is equally good. The horns are large, and very peculiar; they spread at the roots so much, as nearly to touch each other; they proceed backwards and grow outwards, so as to be somewhat spiral. The little ears peer out of these folds, and a dull, heavy-looking head is situated between. The throat is flabby and hairy; the breast narrow and thin, sinking backwards, almost behind the fore legs; and the fore quarter is short. There is a falling of the back behind the shoulder, and a rise at the rump. They are now much improved by the infusion of a little Leicester blood. Their hardiness keeps them very popular, and they produce on poor land and bleak situations what the more valuable and less hardy Leicesters do on rich soils and abundant crops—wool and mutton assimilated from the most worthless herbage. In these capacities they are extremely valuable.

We close this chapter with the *Bamboroughshire Sheep*—a breed very peculiar and valuable, both for readily making mutton and providing valuable wool; and yet it is scarcely named by half the writers on sheep. It is bred in the south-eastern parts of Northumberland and north of Durham,—in fact, from the Tweed to the Tyne,—and the regular fair for their purchase is Rodbury. The flocks are remarkably like each other; they have flat level backs, are good graziers, producing 6 lbs. of wool of a strong but close quality, and will weigh 22 lbs. per quarter when fat. The heads are placed horizontally, and they accumulate fat rapidly; indeed with ordinary keep the ewes are always fat. They are somewhat voracious feeders, and consume a great deal of food. The fat is laid on most extensively and internally, but not duly mixed with the muscle; and consequently the mutton is somewhat insipid. In feeding they increase more in fat and less in muscle, perhaps, than any other breed. From their extreme likeness to each other they seem to be a distinct breed. They are a good deal grazed, and the ewes are purchased for lambing in Yorkshire. After the lambs are weaned, the ewes soon become fat on grass in summer, and the lambs soon feed for the butcher.

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CHAPTER VII.

ORIGIN AND HISTORY OF THE WOOLLEN TRADE.

The first covering, in the sense of clothing, adopted by man was doubtless the skins of animals. It was evidently much easier to use the dried skin of one animal to which it could be of no further use, than to set about any contrivance whatever to imitate the covering which kept off the rain and the sunshine, the cold and the heat; and hence common intelligence would dictate, in a moment, what indeed had been anticipated by the Author of man's being, the clothing of primeval man in the skins of animals.

To the death of an animal, however, we must always feel we are indebted solely for its skin; and though the hunter might still find it a useful covering, and one supplied him by his calling, it is more likely that those who attended to domestic animals would so far value their lives, as to make some attempt to cover and shelter themselves from the inclemency of the weather by other means than their skins.

That skins were used in patriarchal times, at least as a disguise, we are certain; for the skins of goat are mentioned as the covering provided for the wily Jacob by his designing mother. But it is equally certain that the fleeces of animals were worn at some period very little later than this; for Joseph had a "coat of many colours," made him by his over indulgent father, who seems to have understood how to make use of the fleece as well as the skin, and also to have understood the art of dyeing. But a little later still, the answer of Job to his three captious friends clearly shows the patriarchal custom. Appealing to his well-known liberality and generosity, he says—"If I have seen any perish for want of *clothing*, or any poor without covering, if his loins have not blessed me, and if he were not warmed with the *fleece* of my sheep." (Ch. xxxi. v. 20.)

That the habitations, as well as the dress, of the early nomadic tribes were, partially at least, skins of animals, may be inferred from the covering of the wooden "Tabernacle in the Wilderness," which had a soft covering of "rams' skins dyed red," and a more durable and impervious one of "badgers' skins over that;" although "fine twined linen" was thoroughly known amongst them, as well as the skins and "goats' hair," which constituted a part of the offering.

It is probable, however, that, contemporaneous with or possibly antecedent to weaving, the process of felting was adopted. If wool be pressed together, or considerably heated in junction, or otherwise brought in very close contact, it becomes a thick impervious mass, very difficult, if not impossible, to separate again. This is owing to the structural conformation of the wool. Though the absolute cause was not known, the fact was understood and described at a very early period. The wool is covered with a complete series of scales, or serrations. These are capable of being opened and compressed, and felting is no more than the junction of these, and their compression with one another. So far will this go, that even the smallest particle of wool seems to possess the above quality. Youatt gives the serrations of Southdown wool at 2080 in an inch, and in Saxony wool 2720. If the oldest and most worn-out cloth, in which the felting has been only partially carried out, be torn to pieces almost resembling dust, and subjected to heat and pressure, a thick kind of cloth, formerly used for wadding for coats, and more recently mixed with a small quantity of fresh wool and worked into new cloth, will be produced. The machine which thus tears the filthiest rags is called, from its many crooked teeth, a "devil," and the refuse, when it has passed through, is called "devil's dust"—the latter part of which appellation is absolutely expressive of its character.

To this felting property we have long been indebted for our hats. It is mentioned in the "Iliad" of Homer.[*] Plato speaks of it as "cloth made by the thickening of wool." Pliny describes it with the more practised eye of an observing natural historian, as "parcels of wool driven together by themselves make cloth." Herodotus, when he describes the clothing of Xerxes' army of Persian soldiers, says, they wore "light and flexible caps of felt," which he also describes as used by the Medes and Bactrians. Julius Cæsar,[†] finding his soldiers annoyed by the arrows of Pompey's army, describes them as making shirts or clothing of felt, to protect them from the archers. Thucydides mentions a similar device to protect the body from the effects of arrows.[‡] The more peaceful Greeks used the wool for a more pastoral purpose. They clothed their sheep with felted wool, according to Aristotle, in order to produce an impression on the texture and colour of the fleece. Tasso mentions that the Attic sheep were clothed to improve and preserve their fleeces, and Demosthenes calls them "soft sheep."

So well understood was the practice, that in relation to it and the naked children of Attica, the cynic Diogenes said, "he would rather be the ram than the son of a Megareusian."[§]

It was the impossibility of felting the hair of the goat and the camel, doubtless, which first suggested the idea of weaving.

Tasso says—"As the sheep yields to man wool for clothing, so the goat furnishes hair for the use of sailors, and to make ropes for military engines and vessels for artificers.[‖] . . . The goats are

[*] Il. x. 265.
[†] Bel. Civ. iii. 44.
[‡] Thucyd. iv. 34.
[§] Diog. Laert. vi. 41.
[‖] De Re Rusticâ.

shorn in a great part of Phrygia, because there they have long shaggy hair. Cilicia [*hair-cloths*], and other things of the same kind, are commonly imported from that country."

Aristotle and Pliny indirectly corroborate this testimony.

The character of this cloth is intimated in the prophetic symbols of the signs of the second advent :—"The sun shall become black as *sackcloth* of hair."

Dyeing seems to have been of very ancient origin; and Nature appears to have suggested the idea in the rearing of black, white, and party-coloured sheep. The city of Sæbaris stood between two rivers, the one called by its own name, and the other Crathis. The white breed seems to have flourished in one valley, and the black in the other; hence the inhabitants believed that the sheep which drank of the Sæbaris were black, while those which drank of the Crathis were white. Horace speaks of the river Galesus,

> "Where flocks of richest fleeces bathe ;"

as if an impression prevailed that the waters of the river had some influence on the *texture* if not the colour of the wool.

The same idea of the value of the washings in that river, either in dyeing, cleaning, or refining the wool, occurs in Martial,* where Chloe gave to Lupercus

> "Of Spanish Tyrian *scarlet* fleeces,
> And togas washed in warm *Galesus*."

The same writer makes the Apulian flock to be white :—"Of white thou hast to clothe a tribe—sufficient stock—the fair produce of more Apulian flocks than one." † That brown and red wools were also grown, is shown by the same authority—"While Rome delights in the *brown*, gay Gaul prefers the red,—gratifying her blood-thirsty children." "Tyrian purple" is alluded to by Juvenal. Bætis had fleeces possessing "metallic tints," especially the prized "golden hue," and also the sober *native hues* of "Bætic drab or grey." The two colours of Spanish wool were said, in 1607,‡ to be one a golden yellow, and the other a ferruginous or brown colour. These colours probably depended on the soil on which the animals fed.

The ancient monuments give the earliest indications of the wool trade. On an ancient Roman altar dedicated to Hope, above the emblematic ears of corn and the bee-hive, is a distinct bale of wool. On the altar to Silvanus is the caduceus of Mercury and a bale of wool, evidently tied with twisted and knotted cords, as if packed up for exportation.

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* Lib. iv. Ep. 28. † Lib. ii. Ep. 46.

‡ By Raminez de Prado.

The woollen manufactures seem to have been common amongst the Belgæ and the Gauls. The latter is alluded to in contrast to the proud purple, or Tyrian, and designated "goss Gaulish grey." In Juvenal's ninth Satire, allusion is thus made to Gallician manufacture :—"Some coarse brown cloak I may happen possibly to get—some Gallic fabric, as a defence from the rain."

When Britain was conquered by the Romans, Cæsar describes them as possessing cattle, being a pastoral people; and the northern Celts, who lived north of the Thames, did not grow grain, but lived on milk and flesh, and clothed themselves with skins. Strabo, however, speaks of the Belgæ, or inhabitants of the north of Gaul, who also occupied Cantium, or Kent, as excelling the rest of the Gauls in their manufactures. Eumenius, in his panegyric in praise of the Emperor Constantius, in 310, says—"And fortunate Britain, now the happiest country upon earth; for thou hast been the first to see Constantine made emperor." After dilating on the blessings of its climate, and its general productiveness, he says—"Thy woods contain no savage beasts; thy land no noxious serpents; but an innumerable multitude of tame cattle, distended with milk, and *loaded with fleeces*." The heavy-woolled sheep evidently prevailed in this country in his time.

There can be no doubt, however, but at the time of the invasion of Cæsar there were two kinds of wool produced in this country, and two kinds of garments manufactured by the polished Belgæ, who inhabited Kent. The one kind was thick and rough, calculated to protect from the cold, and common to northern countries; the other a fine soft material, resembling the Highland plaid. Doubtless the one symbolized the wool of the Teeswater or the Cotswold, and the other of the Southdown.

That fine wool was then known, amply appears by the quotation of old Holinshed from Dionysius Alexandrianus, who said—"The wool of Britain is often spun so fine, that it is in a manner compared to a spider's thread." Wherever the British manufactories of woollen might have been established prior to the conquest, Venta Belgarnum (now Winchester), was the place where the Roman fulling factory was established, possibly to manufacture cloths for the dresses of the soldiers of that warlike people. Here, surrounded by the short wools, and at no great distance from the Cotswolds—the long-woolled race of sheep—it is uncertain, for a long period after its establishment, what kind of wool was manufactured there, or what kind of cloths the demand of the day required—only, up to the present time, it seems that this seat of manufacture was never wholly deserted in all the turmoils and troubles of the times subsequent to the Roman invasion, arising from foreign conquest or domestic feuds. It over-rode the despotisms alike of the kingly, the baronial, and the priestly rule, and is now bound up with the rapid advancement of the middle class of society.

The mother of the wise King Alfred is spoken of as spinning wool, and instructing her daughters in the same useful art. The daughters of the subsequent King Edward the Elder were "set to woll worke, taking example of Charles the Conquesteror."

It was not until 1140 that any very definite or distinct allusion is made to the British woollen trade by any historical document. A petition was presented to King Stephen to enable them, by his charter, to form themselves into corporations or guilds. The object of this petition was to possess, under the monarch, self-government,—to have the power of appointing their own members, and subjecting them to such orders, laws, and regulations as they, from time to time, saw expedient.

One reason why trade guilds were readily granted by a despotic kingly power, was doubtless to squeeze from them more taxes than he could from individuals. Thus our early despots were the longer enabled to resist the baronial power, then becoming a great check upon the crown. The guild of Winchester, the old established seat of woollen manufacture, paid one mark (about forty shillings) for the power of self-government; and an annual payment of £16 is afterwards noted. The London weavers paid a similar sum; while that of Oxford paid forty shillings. Others paid even larger sums, important in those days, and showing these guilds to have been of great importance. The Worcester guild paid 100 shillings for certain specific privileges, and in ten years' time the decaying London guild paid £12 only.

In the year 1172 prohibitions against mixing Spanish with English wool were published. Whether national prejudice, or a desire to stimulate the improvement of the wool, was the object, does not now exactly appear. Some imagine that it was done in the same way as the celebrated hop-petition was framed, "because they would spoyle the taste of drinke"—so the Spanish wool would degrade the British article. Be this as it may, this threw the British on their own resources for the manufacture of broad cloth; and from that day they acquired the power of manufacturing it independently of Spain.

The religious crusades of the middle ages drained the country alike of its fanaticism and its money. So impoverished was our Richard the First, that when he was imprisoned by the Duke of Austria, he had his heavy ransom of £300,000 paid by levies on the plate of the avaricious monks; and when they had no plate they had to send one year's produce of wool. Into their hands the best of the sheep land, and most of the silver, were very rapidly finding their way; and hence they afforded a ready means of raising the ransom of their king from the hands of the freebooter.

The inundations of the Low Countries (whose woollen manufacturies appear to have sprung up at an early period, and to have been worked with great vigour) sent over some of the distressed operative Flemings in the reign of the first Henry, which gave an impulse to the improvement of English manufacture. Sir Matthew Hale speaks of the manufacture of cloth in the reigns of Henry II. and Richard as "greatly flourishing."

During the struggles of the barons with the monarchy, the woollen trade seems to have become depressed. The same authority says, that in the reigns of the two first Edwards it was "wholly lost," and the money for wool was made by exportation. The Flemings had again established their manufacture, and beat the English out of the market. The third Edward set about restoring it by vigorous means. Aware of the impetus given to it before, by the importation of Fleming weavers (or from their present skill in beating out the English manufacture) in 1331, he brought John Kemp, with seventy Walloon families, from Flanders, and an Act of Parliament was passed to encourage them. Flemish or other foreign goods were also prohibited by statute, and, to crown all, exportation was altogether prohibited; although it had before raised the sum of £534 — a large sum in these days, equal, perhaps, to £8000 of our money; and this at a period when population and trade were equally scanty. The promises made by Edward to the Flemings, during his visit to the Duke of Burgundy, were faithfully kept. Part of them were located in Kent —the seat, no doubt, of woollen manufacture before the Roman conquest. Some settled in the valleys of the Severn, where they established the celebrated manufacture of West of England cloths; while others went to the valleys of the Aire, where they found localities and water suited to their requirements. The two latter localities are still the seats of woollen manufactures in this country.

Edward strengthened both his purse and his country by these judicious steps. He found that the woollen trade he had encouraged afforded the sinews of power in his wars with the French; and when English wool after this found its way again to Flanders, in 1337, it sold for £400 per sack, and 10,000 sacks were sold at that time in Brabant.

The hilarious reign of Henry VIII. gave an impulse to cloth manufacture, though his enactments appeared calculated to depress it. Still, when one man (John Winchcombe) could equip sixty soldiers at his own expense, and maintain them at the battle of Flodden Field, it is evident that his one hundred looms had realized him a considerable profit. This was a way in which the manufacturers were able, when willing, to assist their monarch.

The privileges to certain cities, for services rendered, doubtless had an origin somewhat in this manner. York had an exclusive monopoly granted in the manufacture of coverlets; and worsted spinning was limited to Norwich.

Another impetus was given to the trade by Elizabeth. Home industry seemed now and then to require an impetus by importations of men from abroad, in the same way as a stock often requires foreign corrections to keep up its stamina. The persecutions of the Duke of Alva banished several manufacturing Protestants, to whom Elizabeth gave ample protection, and afforded a home; and they brought with them all their accumulated improvements and skill. Of these, five hundred took refuge in London; and the southern seats of manufacture had large influxes of weavers. The scarcity of hands complained of in the reign of Henry VII. disappeared; and Norwich had no longer to complain of any deficiency. In this reign, trade with Russia and the formation of a Russian Trading Company followed, and still further increased the foreign trade of the country. The Turkish Company was established in 1581; the African Company in 1585; and the East India Company in 1600.

In 1667 another importation of foreigners—not manufacturers, indeed, but dyers—arrived in England, headed by a person of the name of Brewer. The principal English dye had hitherto been wood; but he taught them all the mysteries of dressing cloth as well as dyeing.

In the reigns of the Charleses, the public turbulence and arbitrary interference seems to have crippled the trade. By Charles II., as well as by the Commonwealth, the exportation of wool and sheep were strictly prohibited.

Manufactures seem to have steadily progressed in the reign of the liberal and open-hearted William III. Considering Ireland to be a linen and not a woollen manufacturing country, he discouraged woollen manufacture there. The linen and silk trade were pushing onwards, and treading on the heels of the woollen trade. Florentine wool manufacture was stimulated by every means, legitimate and otherwise, and Sweden began to rival England. These were all competitors for public favour, and tended, no doubt, to render the English struggle to keep her foreign trade much more difficult.

The Georges took considerable pains to encourage the woollen trade. They were indebted to it in more ways than one. Manufacturers and staplers raised troops to assist them to repel the invaders. John Routh, a stapler of Thorpfield House in Yorkshire, raised a troop, and had colours presented by his sovereign, George II., for his loyalty. Like the assistance rendered to Henry VIII. by John of Nayland, it was the more acceptable because it was cheap. The king did more. He granted a charter (which is now in the writer's possession), conceding freedom of tolls to John Routh and others on the Aire and Calder rivers—an immunity of great value to a wool stapler.

It was in the reign of George III. that our manufactures rose to their pinnacle of greatness. We were at peace, though heavily taxed, while all the world was at war. A great portion of our great national debt doubtless went into the hands of the British manufacturers for the cloths they manufactured and fortunes were realized; which created a fourth estate of the realm—the *millocracy* of England. In the reign of George III. inventions in mechanical appliances, stimulated, doubtless, by the vast demand for woollen goods during the war, have placed the English clothier amongst the most flourishing and successful in the world. Our happy island, unscathed by foreign invasion for eight hundred years, has been an arena where he might well challenge the world for competition. At this period we obtain wool from Australia, Germany, Spain, Russia, the Cape of Good Hope, South America, and the East Indies.

The following will show the relative importations from the principal of these countries for the year 1815 and 1849:—

Total in 1815	.	13,634,167 lbs.
,, 1849	.	76,768,647 lbs.

An increase of nearly sixfold in the thirty-five years since the peace. The countries from whence it has been received have also varied in nearly an equal degree, and displaced each other, as will appear from the following list:—

	1815.	1849.
Spain	4,937,438	127,559 lbs.
Germany . . .	3,137,438	12,759,011 „
Australia . . .	73,171	35,870,171 „
Cape of Good Hope .	23,363	5,377,495 „
East Indies . .	——	4,182,853 „

The declared value of the woollen manufactures exported was—

In 1789 .	£3,554,160
1829 .	5,372,490
1847 .	7,897,402

Thus a greatly progressing trade has been going on during the present century.

In England the woollen manufactures will always be intimately bound up with its pastoral character. Though dependent, as will be seen, on foreign countries for a large amount of the raw material, it still derives a great mass from our own country; and the paying character of sheep, both directly and indirectly, will have a great tendency to keep up the mutual dependence and reciprocity between the wool grower and the manufacturer.

The present extraordinary rage for cheapness is amongst the most wonderful tendencies of the age. It is inducing the English manufacturer to make up fabrics mixed with calico, and to work up wool dust, which will not redound to his credit or his high rank in foreign lands.

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CHAPTER VIII.

BREEDING AND REARING.

The principles of sheep-breeding differ but little from those of breeding any other class of animals. The real intrinsic rules are in all respects precisely similar. If one person is more successful in breeding sheep, and another in breeding cattle, the cause is attributable to that persevering attention which is required to keep the mind undividedly directed to one particular pursuit; for if it be diverted to two very different objects, one or the other, in all probability, will be more or less neglected. In order to succeed in life, a man must have one object. "Too many irons in the fire," is an adage more applicable to breeding animals, perhaps, than even to the blacksmith, who runs the danger of "some burning, and some getting cold." The breeder must watch tendencies and results day by day; and an alloy brought into his flock will, if the produce is not sacrificed, be the ruin of the race.

The first rule is to *breed from the best;* but this has its limitations and restrictions. A man may easily ruin his flock by adhering to this rule, without attending to its antecedents and adjuncts. There are two modes of effecting it. One man will scour the whole country to obtain the best ram, or to buy a few prize gimmers. From these he will select the most promising, and insure better alliances for his flock. The result will be a set of nondescript mongrels. Some distant impurity of breed manifests itself; some tendencies, far back in the genealogy of the race, break out, which are modified in one case, and fostered in another, until the flock shows signs of indiscriminate and injudicious dabbling.

Another man, better acquainted with the rules that regulate vitalism, takes his own flock, and having selected the best, he takes only those which he *knows* to be of the same breed; and thus goes on steadily aiming at giving breadth to the animal. He knows that the sheep, in order to thrive, must have a large lymphatic system. He must have a capacious chest and loins, and a frame on which to secrete fat, with lightness of offal. Hence he does not select at first that which has the most of these qualifications, but which is, perhaps, the widest form, and most unlike his own flock; but he takes those which show a tendency to pervade, in one uniform direction, not an individual, but the whole of the flock; and this he takes to mend his own. By this means all are a little improved in the direction he requires; and all keeping *alike* in their general contour, there is a kind of permanency and uniformity in the main features of the improvement.

Hence, if we look at the flock of the first-named breeder, we shall have breeds both large and small, "bony" and "bloody," rough and fine, white faces and blue, coarse and tender,—in fact, a set of mongrels, none of which was of sufficient value wherewith to form a flock, and none to be depended upon for any future breed.

The other breeder, by his cautious and judicious course, has an *uniform flock*—a mark both of purity and of skill; for no unskilful man ever long kept a flock in a state of anything like similarity to each other. Uniformity is as important to the jobber and the butcher as it is to the grazier. The merit of being "even" is always appreciated in a market, because they always suit the same class of customers. One butcher buys a large fat animal; it suits his friends: another, a light, thin one (wool being required by one, and mutton by another); one requires fat, and another muscle; and to make an uneven lot of sheep sell for all they are worth in a market, they must be judiciously sorted.

Perhaps the best criterion of a good breeder is "brains." He must have great powers of discrimination and perception; and then he will usually judge right. If he can readily see what suits his flock, he can easily obtain the animal in one place or other.

The usual course is to breed from the flock-master's own ewes, and to buy a ram from another breeder. The breeder makes two selections:—first, he drafts off the ewes of his flock which are unfavourable to his objects, then selects the best of his gimmers from the flock of the preceding year; and, keeping an eye to the intended characteristics of his animals, he selects a ram suited to their condition, of the same breed. The ram must be one thoroughly bred. Unless selected from his own breed, whose history, age, biography, and chronology he knows off by heart, the ram must have been used one year at least on a small proportion of ewes of the right kind, to try the effect. This may appear over-cautious; but it is safe breeding; and by this alone can thorough purity and caste, as well as uniformity, be obtained.

If there is a difference in the general outline of a flock, this is to be corrected by acting on the flock itself, and not by a new repurchase—a state of things seldom desirable, or, indeed, possible. Sometimes two, or even three, rams are given to specially-selected ewes, in order to secure a more general uniformity. But this is seldom satisfactory. Uniformity is best attained by drafting off regularly the failing ewes, and breeding from one common sire, which appears to have a peculiarly favourable influence on the breed,—greater even than the mother appears to exercise on the flock; for while a mother can only influence two animals, a ram will influence the whole of the produce, in a greater or less degree.

The main points in a ram are too well known to require any minute or elaborate description. The *points* attended to in the preceding pages, descriptive of the different breeds of animals, will be a general guide, more accurate than a very detailed description at this particular stage. Light offals, fineness of skin, absence of superfluous and coarse wool, and broad and deep-round frame, are the leading features. The back should be broad (especially near the shoulders, which is often a failing point in sheep), and well covered with solid but yielding and slightly elastic flesh,—not mere made-up flabby fat; though it is sometimes said that an animal on which it is possible to get a full fat development is one to be selected, on the ground that in a bad one this is impossible. As fat, however, is necessarily laid on muscle, it appears to be obvious, that when there is plenty of muscle, the fat msy be expected to follow. A deep chest, broad at the base, is what must be aimed at; for the butcher always examines it as indicative of *weight*. It is the boiler of the steam-engine—the source of all the locomotive power, the mainspring of its energy. It must be thoroughly capacious, or there can be no successful feeding. The sheep must walk *wide* on both legs,—not a huddling, crippled staggerer, but a steady, firm walker,—holding his legs at a distance of at least six inches parallel to each other. The head must be fine, not flat, but rather broad, and the eyes very full and prominent, exhibiting, on the whole, an expression of quiet liveliness. The ears must be small; and the bare parts,—the face, ears, and legs,—whatever breed the animal may be, must have fine wool or hair upon them. The colour, too, is of great consequence. It will vary with the different breeds. A departure from white in the Cheviot would be as great a failing as black in the Highlander, brown in the Southdown, or blue in the Leicester. On this point there may be discussion. The colour of pigs once decided their merits, even to qualification and disqualification to compete at the Royal Society's Meeting at Derby. This was ridiculous enough; but the colour of the face of a Leicester is, in our opinion, of far more consequence, in a fattening point of view, than is generally imagined. It ought always to have a tendency to light blue in the ram, or we should suspect some Leicestershire or Teeswater tampering; not but that both are legitimate, and even an advantage, if judiciously made, for ordinary turniping wethers, on good sound turnip soils. Then good legs should be secured, if possible. The tendency is to encourage flesh developments on the back, to the neglect of the legs, especially in the Leicesters. Some of the best that we have seen are, in all other respects, sadly deficient. The fine development of the back seems not only to have robbed the leg of its muscle, but, by contrast, to have exaggerated its own deformity. The dread of a long, coarse leg of mutton has diminished the circumference, as well as the length; and, though a short leg of mutton is desirable in a Leicester, we must guard against a loss of its rotundity. Size is also of consequence. The finest specimens of Leicester—the purest and most symmetrical—are now decidedly the smallest. Breeders must earnestly look to this, and be careful, in selecting the ram, to have masculine qualities enough to secure a hardiness in the flock.

Before we describe the desirable qualities of the ewes, we must here enter a protest against the unnatural practice adopted by some ram breeders,—a practice too much fostered by the demands of their customers, but a course absolutely destructive of the finest breeds. The ram is a victim to his stomach. He is rendered miserable by over-cramming, in order to be ripe for the "show" which is usually held in August. Even art is resorted to, in order to exhibit the unhappy animal in a state as fat as nature can make him. No change of food, rung in infinitesimal changes,—no provocative of appetite,—no promotive of sleep,—no comforting or quieting dose is grudged or withheld for a moment. Cabbages, cake, corn, peas, malt, even rum and new milk, are employed in succession to keep the animal almost unconscious of want, or full to repletion. He is heavy, and somnolent, and fat, and the ram hirer thinks he has got a bargain. But the sale or letting being over, he is brought down. In his over-fat state, he would not look at an ewe. The gastric secretions had entirely overcome the sexual system. Hence, at pairing time he is a decaying, and fading, and reducing animal; and this, added to his previous pampering, makes his virility very doubtful.

The ewe should be straight and broad-backed, wide in the loins, and, what is often a failure in ewes, deep-breasted. She will always be sharper-angled than the ram; but breadth and depth, with fineness about the throat and legs, should be a special object.

After what has been said of uniformity in the flock, it is hardly necessary to say that the ewes should be as much alike as possible; and not only appear alike, but be, as nearly as possible, from the same general stock, with the same tendencies and peculiarities; so that any counter influence, brought to bear on the flock in the characteristics of the male animal, might affect the whole flock alike in a favourable manner.

The *cross-breeding* of sheep has attracted a great deal of attention; and it is odd enough, that it has all resulted in the adoption of *one* of the ten or twelve pretty distinct breeds as the crossing race,—at least on one side. Whatever may be the kind or quality of sheep, it seems now to be a settled rule that the *best cross which any sheep is capable of is one with the Leicester*. Whether Downs or Scotch Highlanders,—whether Cheviots or Cotswolds,—they all seem to answer the best when crossed with the Leicester.

So far we seem to have got one general rule, but another appears to be pretty well in practice. It is not usually judicious to breed crossed animals. Uniformity, symmetry, and often disposition to feed, are lost by such a course. To cross almost any breed, pure in itself, is an advantage to the person who possesses the next generation; but when these are again attempted to be set up as breeders, the advantage seems to cease.

The most usual crosses are those of the *Leicester with the Southdown.* The true Leicester is unfashionable, though a paying class of mutton. It is fed too early, and is too fat for the amount of muscle to secure favour at the tables of the rich epicure. The advance of luxury seems to be greatly in favour of the discarding of that profitable animal. To this we shall afterwards advert. The Southdown has been selected to give a quality to the mutton, a fineness to the fleece, a tendency to lay on fat, with hardihood; and for several years a most successful breeder, Mr. Thomas C. Johnson, of Chevet Grange, near Wakefield, has been one of the best farmers in the West Riding of Yorkshire. We happen to have seen some extraordinary specimens of his flock, embracing, perhaps, more of the qualities of the two breeds than could be conceived possible. There was considerable size, a heavy fleece of the finest wool, large frame, plenty of fine-grained mutton, with early maturity, and a fair mixture of fat and muscle. These are qualifications seldom realized in one animal. What is more, they were precisely like each other. The result seemed uniform; and though they cannot be considered as stereotyped characteristics, yet they are qualities preserved with considerable tenacity, and, we are assured, not at all obliterated by continuing to breed in and in with the crosses. Be this as it may, the result is pretty certain; and a good flock of Southdown ewes, put to a Leicester ram, may, with pretty considerable accuracy of calculation, be depended upon as a successful cross of sheep,—fashionable to the butcher and wool dealer, profitable to the farmer, and more to be depended upon to meet a market than, perhaps, any other class of sheep, if we take the average of the run of seasons. We have heard of the reverse. Mr. Johnson has himself succeeded in breeding good produce from Leicester ewes and a Southdown ram; but we think that evidence is entirely in favour of the reverse of this cross.

The Cotswold is sometimes crossed with the Leicester, and with some considerably encouraging results. The fashion with Leicesters, as we shall presently show, is to feed them at one year old. For this purpose they are somewhat small,—their weight seldom exceeding, and not often reaching, twenty pounds per quarter. The Cotswold gives *size;* and thus we may expect to see the Leicester increased, perhaps, two pounds per quarter in the spring, if the tendency to fatten is not diminished by the cross, which seems not to be the case. We have seen a few specimens, but hardly sufficient to be able as yet to form an opinion so accurate as to speak with any great degree of confidence. Mr. Peter Stevenson, of Rainton, a sound experimentalist, has for two years persevered in sending for Cotswold rams to his Leicester ewes; and the lambs have shown the fattening propensities of both, with an improvement in frame and size,—both great objects to the grazier and the breeder.

A cross of a wider difference is that of the *Leicester and the black face.* This, though an union of breeds apparently so dissimilar, is one of a well-established character, and is both profitable and successful. The hardihood and good mutton-qualities of the one, added to the feeding qualities of the other, produce a cross of a very valuable kind. Mr. Dickson mentions a specimen, slaughtered by him, weighing 39½ lbs. per quarter, and having 12 lbs. of wool, selling at 1s. 3d. per lb., nearly as fine as the Leicester. These, though wonderful exceptions, are indications of the thorough success of the cross, which is now very extensively adopted on the hill sides of Scotland; and vast numbers of the sheep, valuable both for wool, mutton, and hardihood, are now consuming the green crops of the north. So general has now become the system, that it is calculated that there are 15,000 true bred Leicester ewes employed in breeding rams for the purpose of crossing in Scotland.

To form some idea of the result of the cross, it may be taken as follows:—The sheep, at from eighteen to twenty-four months old, will average 21 lbs. per quarter, and the wool may be 5 lbs. per fleece, worth 1s. per lb. They are fed on seeds in summer and turnips in winter. They are a hardy, profitable race, which feed with considerable facility; and they always command a ready sale in the market. The ewes are kept entirely pure, and are intended for black-faced breeders; or a black-faced Highland ram is kept for the ewes intended to breed store gimmers.

The Leicester sheep used are by no means of the very highest breed. They are good, useful animals, but by no means delicate; and somewhat lower in the scale of pedigree than would be admitted in the catalogue of true Leicesters; but, hardened and acclimatized, they make an excellent cross.

The cross between the *Leicester and the Cheviot* is also in favour, and is one which has been perhaps longer practised than that of any other breed. The crosses are fast swallowing up the pure Cheviots, as far as sales at the markets are concerned; and fully two-thirds of the sheep with Cheviot blood are now crosses with Leicesters. The size, the fatting propensities, and the early maturity obtained by the cross, and modified by the hardiness of the mountain breeds, render the union peculiarly valuable. An increase in the market-value of from 2s. to 2s. 6d. per head is secured by the new infusion of blood. If a breeder has 500 or 1,000 sheep, it will make a difference of possibly £150, or more, in his receipts; and this at little extra cost, the small amount of better keep, scarcely appreciable in a farm, making all the difference.

Some parties carry the cross further. Not that they breed the crosses between each other, but they again carry the crossed lambs, or hoggs, to a Leicester ram, and this as often as four or five crosses, until the Cheviot blood gives way to the Leicester; enough only being kept to secure sufficient hardihood for the high-lying lands and exposure of the north. These are sold at fifteen or sixteen months old, and will even then weigh 17 to 18 lbs. per quarter. Sometimes they are fattened on their natural hills, and sometimes sold southward to graze,—grass-feeding being more favourable to them than being confined to turnips. We happen to have some grey sandy soil, on which they will die in great numbers, from no apparent cause.

The only cross where the Leicester breed is absent, of which we can report anything remarkably successful, is that of the *Cheviot* and *Black-faced*,—the rams of the former and the ewes of the latter. This cross is calculated for barren pastures, and situations more exposed than can be borne by any of the crosses before enumerated. The sheep are particularly hardy. Indeed the union of two such hardy breeds can scarcely tend to diminish that peculiarity; while the quality of the mutton of both seems to be retained. It is a cross which requires perseverance. The first is not always entirely successful. Carried back to the pure Cheviot ram, it improves at every stage; until rapid feeders, good mutton, better wool than either of the parents, and larger weights, are amply secured. Careless breeders may soon select a bad specimen of both to breed from; but when the largest and broadest of both sire and dam are selected, the cross is eminently successful, and is in great favour with the grazier, the butcher, and the consumer.

Complications of crossing are not very successful. It is almost impossible to obtain uniformity by any complexity of breeds; and all attempts should be on a small scale, and the results watched and carefully noted. If a Leicester were brought to a cross between the Cheviot and Highland, no one can tell what the result would be; probably, from the contentions of the counteracting blood, it would be a hard feeder. A struggle would probably grow in the vital processes very unlikely to tend, on the whole, to improve the physiological tendencies required by the grazier; and some they might probably destroy. A cross between the Teeswater and the Leicester, carefully bred for a long period, might give both size and feeding qualities to the smallest class of Cheviots; but it is doubtful if the two first-named breeds were not originally identical, and that cross is by no means a violent one. The same may be said of the Lincoln; but we should by far prefer our own bred cross with the Cotswold at once, as attaining all that is desirable by a more direct and certain means.

We now approach the *management of breeding ewes and rams*, and shall first apply our attention to the Leicester breed,—not only because they require the most attention and care, but because their management will, with little modification, apply to the best plans adopted for almost every other breed.

From the last week in September the ewes begin to be better kept. Either they are put on aftermath or clover stubble, or what is by far the best, on rape. If a numerous produce is the great aim, a most wonderful and almost talismanic effect may be thus produced. It may be depended upon, that an increase of full thirty per cent. of lambs may be attained by keeping the sheep on rape at the time and just before the ram is admitted to the ewes. We have witnessed the most remarkable instances of this. We have known flocks, in a run where lambs were not a remarkably plentiful "crop," where the only single lambs were from those ewes which had been twice served by the tup, and the last service had been after the rape was done, when all the rest were double, with the exception of threes and even fours. We knew a small farmer who had thirty-four lambs from fifteen ewes so fed. The two cases of single lambs were those which had "come over," as we before intimated.

A ram, when shearling or two shear, will serve sixty ewes, or even eighty, if proper care be taken. The too common mode is to allow him to run with the ewes at large. This is a great waste of the animal's virile powers; and when as many as the last-named number of ewes are given him, another course should be adopted. A shepherd should be left in entire charge, a pen or pair of stocks, as it is indifferently called, provided, and the ram kept confined in the house, or in a very small croft. An active, lively ram should be sent with the ewes, and should have an apron tied about the crop, so as entirely to cover the genitals. If his breast is smeared with red it is no disadvantage, as it more distinctly marks the ewes. When an ewe is observed in full season, she should be brought to the stocks, and served by the ram with whom she is intended to produce, and immediately carried away.

There are physiological objections to this; but when eighty ewes are provided it is indispensable, and when twenty to thirty guineas are given for the loan of a ram for one season, it is not unreasonable to expect him to discharge more duties to the flock than is possible by running at large. When the flock comes in season very rapidly the ram serves them only once; if not, they are served twice, and then turned away for a fortnight, when they are brought back to the teaser; and he is then smeared with a blue or black colour, to distinguish those who come once. When the ewes are not named, which, we are sorry to say, is too often the case, they should all be numbered, and a register kept of the ram and his breeding, and the date of each ewe being served. This is not only an invaluable record in the case of pedigrees, but it is still more useful as being a guide to housing, when near the period of lambing; and, though the doggrel distich is true that—

> "There was never a shepherd, that ever begun,
> Can tell whether they go nineteen, twenty, or twenty-one,"

still a very important classification is secured by those who have their register, who cannot house the whole flock, especially in a time of severity and difficulty.

When the active process of gestation has commenced, care should be taken to prevent the ewes getting too fat. If they do, inflammatory disease, absence of milk, and general risk, are sure to be the consequences.

A run in the pastures, from October to the end of January, with a little hay in foul weather, is far more wholesome keep than any very nutritious or stimulating food. To put ewes on turnips with fat sheep, is of the two a more dangerous evil than absolute pinching. We had rather see ewes lean than fat in February. Assuming them to be calculated to lamb late in March, a few turnips may be given them on the grass from the month of February; and when within a month of lambing, the most stimulating and invigorating food should be given. By far the best is about a gill of corn per day each animal, being supplied morning and evening in troughs. This fills the system with strength and vigour to get over the lambing season, and makes them abundant in milk to provide for the offspring. As ewes are subject to the tick, it is desirable to water them in the course of the autumn or winter in a mode similar to the one hereafter described.

The average period of gestation is, as we have seen, from twenty-one to twenty-two weeks; and about a fortnight before that period expires, the ewes, as described in the register, should be separated from the rest, and placed in a grass croft near the house. They should have shelter afforded from the north and east winds by temporary houses made of hurdles and straw, in which the unlambed ewes may be confined in stormy weather,—with smaller houses in which the newly-dropt lambs may be separated from the rest, and kept free from danger.

Small as is the expense of this process, we are sorry that it is not always attended to. For the lambing season a croft of winter-freed grass, or what is even better, uneaten fog should be preserved; and of these there should be three or four,—one for the ewes likely to lamb first, in which should be the large shed, and one for the recently-dropt lambs, in which should be the small huts. To save the grass, in a time when, from a harsh spring or other reasons, it is unusually scarce, the ewes may be driven daily to the turnip-field, and taken off at night. It is a place which, as affording them exercise, is very beneficial.

The best food for the ewes, after the lambs no longer require shelter, is Italian rye-grass or rye. The mode of cultivating it is given in the Journal of the Royal Agricultural Society of England.* Nothing will grow more rapidly after being eaten down, and nothing will teach the lambs to eat sooner than this forward rye. The corn should still be continued along with Swede turnips; while the advent of fine weather, and the diminished wants of the lamb, will be the criteria for deciding when the practice ought to be discontinued.

As in our treatise on the "Cow," we shall reserve our observations on parturition for the chapter on Diseases; for though it can scarcely be classed as a disease, still it requires that kind of treatment which diseased animals generally have afforded to them; and as such will best appear in that chapter.

At the risk of a little tautology, we cannot help referring to the management of the *house lambs* intended for the London market by the Dorset breeders. These ewes being more willing to take the ram at an early season, are put to, so as to drop their produce at Michaelmas. Old ewes are invariably selected; that is to say, those which have had lambs once or twice before. As soon as they are dropped they are carefully separated from the ewes, and placed in a lamb-house or barn, with chopped hay or straw for food. The ewes are taken to them to suckle three times a-day, remaining with them no longer than is necessary for that purpose. The ewes are supplied with the very best food that can be had for them; and chalk is laid for the lambs to lick inside their house. As soon as possible, the lambs are tempted to eat chopped clover, bruised corn, bran, and split peas; and after the first lot are drafted off to market about Christmas (or from that to Candlemas), the remainder are suckled by the mothers.

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* See "Milburn's Prize Essay on Early Spring Feed," R. A. S. Journal, Vol. ii., p. 2.

The *weaning* of lambs is a delicate operation, and one that requires great caution. Mr. Smith, of Burley, whose practical knowledge well earned him the prize for his Essay on the management of sheep, says the ewes should be taken from the lambs, and not the lambs from the ewes. It is always best, however, to place the ewes and lambs together in a pasture most suitable for the lambs. The ewes should be carried out of hearing of the lambs to a poor pasture, and milked for a few days, until the lactiferous system ceases to secrete, and then it is best to send them to a cool upland, if possible.

The season for weaning lambs reminds us of the sad ignorance often displayed on this highly important part of a farmer's proceedings. Too few sheep are often kept to afford the sole charge of a shepherd, and so to admit of the perfect division of labour; and when even a shepherd is specially kept, he is too often ill-acquainted with the duties of the office. They are generally ill-educated, little acquainted with animal physiology, and full of superstition. The farmer has to run the risk of employing persons, not who pay premiums for education in the branch of art they practise, but who are paid for attending to their duties, and, in the course of payment, catch just as much knowledge as will enable them to obtain more pay from some one else, or from the same individual. This is a fact often lost sight of, in discussions on the wages of the labourer in husbandry, and in reflections on the capabilities of that class of men. A tradesman, a carpenter, a shoemaker, a tailor, not only foregoes some four, five, six, even seven years of service and pay, and gives a premium to be taught a trade,—his tools cost him a considerable amount,—and yet his pay, as a journeyman, is contrasted to disadvantage with the farm-labourer, both as to his wages and his qualifications.

But it is not always the servant who is to blame. It often happens that the master himself does not thoroughly understand the principles of natural history as applied to these animals. The lamb for the first few weeks of its existence depends on the supply of food from its parent alone. It is the very source, and contains all the elements, half assimilated, of blood, of muscle, and of bone. At this stage the supply of the mother is often neglected. She is exposed to cold, and suffers hunger. The milk which nature drains from her system is exhausting her powers, and yet no shelter nor extra food is afforded. This is not the shepherd's fault, and he is not to blame if she dies, or sheds her wool, or becomes unfit to rear her young. A little corn, or cake, or artificial assistance, would have strengthened the ewe, and supplied the lamb with its full modicum of necessary food.

As soon as the lamb begins to eat, its auxiliary to nature's food is often badly attended to. A pasture is selected for the mother as unsuited for lacteal purposes as it is unfit for teaching the offspring to feed, which thus prolongs the dependence of the latter upon the former.

As the increase of vegetable food eaten by the lamb takes place, the supply and the use of the milk diminish. And if a peculiarity of constitution of the mother exists, or if any damage takes place to the udder, or if nature has been overtaxed soon after lambing time, she will become dry, despite of the efforts of the lamb.

At this stage they are often depastured on over-eaten seeds. The bowels of the lamb are tender, and they can ill resist the purging effects of this improper pasture; and hence the shepherd often has scour in the unweaned lambs, and applies the shears and medicine—but, they die. He has not discovered that the lamb is weaned, and has an improper pasture. It is with its mother, and he neither knows nor cares whether she has milk or not. Medicine and shears do not avail, and his lambs die of scour.

Nor at weaning time is a better provision made. The master does take care to put them in a somewhat worse pasture, in order to check the flow of milk, and to render the operation a less risking one of the dam; but, unless he is careful, he is injuring the produce.

Once place weaned lambs in over-eaten seeds, and the whole flock takes the scour, followed by flies, and maggots, and medicine, and death.

Now, a hard old grass pasture, or a second crop of mown clover, will be perfectly safe. It is not the excellence of the pasture, as regards its quantity, which is to be feared, but the quality; for if the land be rich, with grass newly-grown seeds, the scour is certain to follow. Some flock-masters, who have not red clover nor poor grass land, will send their lambs to a poorer soil to graze, until their bowels have become accustomed to purely vegetable diet.

Should scour take place, it is often difficult to stop it. The bowels must be relieved of the dry food, and the system hardened by tonics. A dose of a quarter-of-an-ounce of flower of sulphur in old milk will generally succeed in stopping the disease, if it be properly attacked in its early stages.

Another neglected circumstance, in weaning lambs, is the want of removing the mothers far away, so that they may not hear the bleating of their lambs. Humanity and interest alike require this precaution. The ewes should be taken to a cool, plain, and rather poor pasture, out of hearing of the lambs; otherwise, the excitement and agitation will do them considerable harm. On the second day they should be all carefully examined; and those with swollen udders should be milked. It is no bad plan to wash the udders with cold water. The third day a similar process should take place throughout the whole flock. On the fifth day another and final examination may take place, when they will have forgot their lambs, their milk will be re-absorbed, and they will not appear to remember the loss of their offsprings, about which at the time they made such lamentations.

It is an excellent plan to have a few wethers or barren ewes to put in the field with the lambs after weaning. They teach them to select their food; they draw out the instincts of the young lambs, and materially assist in drawing and training. A pen should be provided in the corner of the field; and to dip as soon as possible after weaning is by no means a bad practice.

As soon as the ewes are shorn, and before the weaning, it is very desirable to have the lambs dipped. If deferred till after weaning, there is often much fretting excited in the lambs, and they seem to suffer more by far than when they are subjected to the process during the period when they are remaining with their dams.

It is often necessary again to dress the lambs in the autumn, and so keep them from the annoying and irritating effects of insects which seem to grow upon them, despite every care, unless they are subjected to frequent remedial applications.

If sale at one year old is intended, the lambs should be kept on artificial food, from the very season of weaning; but this will be a process more likely to be discussed in the following chapter.

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CHAPTER IX.

MANAGEMENT AND FATTENING.

THE question for stock-feeders used to be—how to raise the greatest possible amount of animal food per acre at the least cost. But, somehow or other, the question, as regards that at least, has assumed a somewhat new form. The time was when the largest and the fattest sheep commanded the best price. To take a small and not over-fed joint of mutton into one of the large towns of Yorkshire or Lancashire—to Birmingham, Wolverhampton, or Leicester, was to run the risk of having the commodity neglected. But now it is different. The half-bred Scot or the Down, or at least half-Down, is the only kind of mutton which will meet a market with favour.

The time was when a large joint of fat mutton was put over a dish of potatoes. The meat went to the head of the family; the potatoes, saturated with the fat and gravy, were a savoury meal of the junior members. Thousands in the manufacturing and mining districts have for years been brought up in this way. But now they will have the small fleshy joints, with less fat; or they will buy them at an inferior price. The feeders of the larger kind of sheep are therefore in a worse position. The "good sheep" from 22 to 28 lbs. per quarter—once the favourites—have now to go a-begging, and the feeders of small half-bred animals obtain almost as much money for their once-despised but now fashionable breed. This will soon react on our best breeds; and it will cease to be an axiom that it is an advantage to gain the most pounds of food at the least cost; but it will be the production of that kind of food which will realise the best price; therefore, peculiar rather than good quality will be the desideratum, and the demand for beauty and symmetry will give way to the requirements for early maturity and disposition to feed. The general feeling will thus run wild after the ungainly forms of black and grey-faced "rannocks," and set defiance to domestication and low fences.

Those who wonder what could be the object of the high banks of Norfolk, and the hedges at the top, will be succeeded by men who wonder what men could mean by such low and useless fences as disgrace all our newly improved farms. The facts of the case are beyond dispute. We will suppose a farmer purchasing a score of the Leicester and Cheviot hogs at the same period, feeding them the same time on the same food, and the results will be somewhat as follow:—

	£.	s.	d.	£.	s.	d.
20 Leicester hogs, at 33s., bought in spring . . .				33	0	0
Then say 7 lbs. each of wool, at an average price of 1s. 1d. per lb., 7s. 7d. each, or	7	13	8			
Sold off fat, say at Christmas, weighing 24 lbs. per quarter, at 5d. per lb.	40	0	0			
				47	13	8
The 20 sheep will leave for food and profit . . .				14	13	8
20 Cheviot hogs, at 20s.				20	0	0
Then say 3 lbs. of wool each, at 1s. 1d.	3	5	0			
Sold off fat, 18 lbs. per quarter, at 6d.	36	0	0			
				39	5	0
The sheep will leave for food and profit . . .				19	5	0

Nor is this all. The case may be put in a much stronger light. The Cheviots and half-breds will live and thrive on a poorer quality and smaller quantity of food. And why? Because the taste will not allow them to be fed so fat. It is old flesh or muscle, small joints and light fat, which is the real desideratum in the manufacturing towns where the great bulk of our sheep is disposed of.

Thus we have smaller capital employed, less risk, more kept, inferior pastures stocked, a more ready market and greater profit by the fattening of those which were once considered the inferior breeds of sheep. Public taste in shape of appetite, and public taste in the matter of symmetry and beauty, are at variance; but the former will triumph, for it will pay the best.

To the breeders of Leicester and of the sheep peculiar to Lincolnshire, called improved Leicesters—to the Cotswold, and all this class of sheep,—this is a "heavy blow and great discouragement." The pains and care and struggles of centuries are being put aside by the luxurious tendencies of our manufacturing population, and we hardly see our way clearly as to what they can do. It was hoped that when the alleged cause of the change—the failure of the potato—had passed away, the people would return to their old habits; but, as Sam Slick says, "once accustomed to a luxury, and he is done—you will never get them to give it up." The potato is at least cheaper and more plentiful, but the large, fat mutton is not returned to. It still sells at an inferior price, and we fear it is likely to do so.

What are the breeders to do? There are two classes,—those who breed pure, and those who breed cross animals. The former are the best men of the day in showing fine specimens: they cannot charge shape and quality—a *beau ideal* is before them, and woe to him who violates it! But they must adapt themselves. They might at least have a smaller animal,—they must sell him before he gets so fat. Their breeds will be mature when very young,—they must sell their hogs at one shear, and by rapid changes adapt their animals to the wants of the market.

But to those who are less scrupulous, a cross with a Southdown—the ewes being of the latter, and the ram of the Leicester breed—will produce a very remarkable cross. A Bamboroughshire compact ewe, with a Cotswold ram, we have not seen bred; but we venture to predict a useful and saleable cross.

Let the breeders of the northern breeds look out to improve symmetry and beauty by judicious and patient selection. Why not always breed from the best? Why not buy the gimmers, and hire the rams, which won the Highland Society's prize, for a few years, and make the old despised north sheep symmetrical?

Though there is every probability of the most favoured kinds of sheep, as they have been viewed of late, going downwards in public estimation, because they did not grow the kind of mutton which sells best in the market, yet still all our great agricultural societies adhere to them as the best kinds. The Leicesters are at the head of every prize list; and though the great improvements in the Southdowns have given them of late a much higher range in public estimation, and they are supposed to be a local rather than a general breed, still they are gradually advancing in public favour.

Mr. Lawes instituted a series of inquiries as to the abstract food and increase in weight of these sheep in themselves, and also as compared with the Hampshire Downs, assuming the Sussex Down to be the type of the original South Down sheep. The latter is the sheep of Mr. Jonas Webb, R. Ellman, and the Duke of Richmond: the former is a heavier frame and larger weight, and is also a fatter and more early mature sheep than the latter.

One disadvantage was, that they had to be fed on dry food; they had oil-cake and clover chaff. At first they had food supplied in given quantities, and proportioned to their weight. The quantity given per day to the Hampshires was one pound of each; while to the Sussex Downs it was only three-fourths of a pound of each per day. The former weighed 113¾ lbs., and the latter only 88 lbs. Swedes were also given *ad libitum*, but from quantities previously weighed. The sheep were fed for twenty-six weeks; the Hampshires consumed 1249 lbs. of oil-cake, 1120 lbs. of clover hay, and 16,995 lbs. of Swedes, and the increase of live weight was 428 lbs. So much for the large sheep. The smaller, or Sussex Downs, in fact, consumed 965 lbs. of oil cake, 926 lbs. of clover hay, and 12,445 lbs. of Swedes, and gave an increase in live weight of 324 lbs.

To put it in a more striking light, it required, to produce 100 lbs. increase in live weight, the following quantities of each kind of food in the Hampshires :—

	lbs.	oz.
Oil-cake	294	0
Clover hay	259	12
Swedes	3941	0
Or a total food of all kinds . . .	4494	12

Whereas the Sussexes required, to produce 100 lbs. live weight, the following quantities :—

	lbs.	oz.
Oil-cake	314	4
Clover hay	304	3
Swedes	4086	0
Or a total food of all kinds . . .	4704	7

The Sussex sheep required, therefore, in twenty-six weeks, 20 lbs. 4 oz. more oil-cake, 44 lbs. 7 oz. more clover hay, and 145 lbs. less Swedes, to produce 100 lbs. live weight, or about 7 per cent. more oil-cake, 17¼ per cent. more clover, and 3¾ per cent. more Swedish turnips, for the same result. The taste indicated a difference in the animals: the Sussex sold at about 3s. 2d. per stone of 8 lbs., the Hampshire only 2s. 10½d. per stone; and after paying their way, and allowing for the purchased food, the cake and hay, the forty Hampshire sheep left a profit, as well as the increase, of 6s. 7½d., and the Sussex of 6s. 0½d. per head. The oil-cake is, however, reckoned at only £6 15s. per ton—a price we are afraid it seldom can be bought for—and the clover hay at £4 per ton. Nothing is charged for attendance.

As far, therefore, as this was a paying speculation, neither seemed to answer. The Swedes, the attendance, the washing, shearing, and other et-ceteras, would diminish the profit to less than nil; but this was hardly the object of Mr. Lawes. As an experiment, it required that care and control which it is most desirable to give in ordinary experience, and therefore ought not to be taken as an invariable conclusion; but it may go so far as to demonstrate that it may not be always the best to drive too far for the increase of artificial food.

The forty Hampshires consumed 49⅓ tons of Swedes, and the Sussex only 36 1-10th. The latter were, however, much the smaller, and more would be consumed to the acre.

Mr. Lawes, however, puts the case in another light. He says, "Suppose, then, that in both cases 100 tons of Swedes had been eaten, we should have had consumed with them, and paid for by the increase of the animal—

	Oil-cake, lbs.		Clover, lbs.
By the Sussex sheep . .	17,374	and	16,676
By the Hampshire . . .	16,470	and	14,767
	904		1,909

"That is to say, in consuming 100 tons of Swedes (and the dry foods), Sussex sheep would, according to our experiments, have given the increase from 904 lbs. more oil-cake and 1909 lbs. more clover than the Hampshires. To have consumed the quantities of food supposed above, however, in twenty-six weeks, there would have been required eighty Hampshire and about one hundred and ten of the Sussex sheep."

Now this is what we have considered as the real position of the sheep-feeder in our previous article. The larger sheep make more flesh. From a given area of ground they consume less food for the mutton and fat they elaborate and deposit; but being worth less per pound it is really an advantage, in money matters generally, as regards the production of fat and mutton, to graze the inferior kind.

Though the cases experimented upon by Mr. Lawes do to a certain extent make out the principle we laid down, still it admits of exceptionable features. The large sheep in the north are the improved ones. It is the reverse with the Downs—the small are the improved. And this only strengthens our position. It takes the Sussex Downs out of the category of unimproved breeds, and thus places the smaller sheep in a position of undue advantage.

It is a very serious question whether the farmer will go on, and how long, growing an unpopular kind of mutton. Alas, for the luxury of the age!

Mr. Lawes has carried on his plans, and subjected the Cotswold to the same course. Having, however, originally intended them for a comparative trial with the New Oxfords, but without success, he tried the fifty sheep alone, on different qualities of food, and subjected them to a comparison (as to their fattening tendency) with the two kinds of Downs he had before tried. He commenced with the flock selected by Mr. Garne, on the 24th of October, and fed them on turnips in the field until the 21st of November, when he put them on boards or rafters, and then fed them on oil-cake, clover-chop, and as many Swedes as they could eat. The same proportion of dry food was allotted to the Cotswold in proportion to their weight, which was 113½ lbs. average per animal. The food at first given was 1 lb. per day each of clover chaff, and the same of oil-cake. Near the conclusion of this experiment the oil-cake was increased by one-half. The average weight, on the 1st of December, was 119 lbs. 14 oz.; but there was a difference between the greatest weighted animal of 146 lbs., and the smallest 103 lbs., which showed how vast a variation there may be in a lot pretty nearly equal in appearance.

Mr. Vernon Harcourt showed that great differences of produce would take place in the same field in various parts similarly treated; and Mr. Lawes' experiments show the same results.

In the first month of the experiment, after the weighing alluded to, the increase was in a margin from nil to 22 lbs.; nor could previous weight, or any other element, account for the difference. The weekly average gained per head was 3 lbs. 10 4-14ths oz. during the month.

In the second month the extreme variations of increase were 1 lb. against 22 lbs.; but it is very remarkable that it was not the one which had been the greatest gainer the preceding month, or increased the most, nor *vice versâ*. Though it eventually happened that the one which gained the most was that which realized the greatest amount at the end of the experiment. The average gain in this month was less, being on 3 lbs. 3 7-12ths oz. per head per week.

In the third month the greatest increase was again 22 lbs., and the smallest 3 lbs.; and it is again remarkable that the one which gave the smallest increase in the second month was that which progressed the most in the next. The average gain fell, however, to 3 lbs. 6 1-6ths oz. per week.

In the fourth week the lowest increase was again 3 lbs., and the highest 28 lbs.; the latter being the one which stood highest in the second month. The average increase was 3 lbs. 5 oz. per head per week.

Without pursuing the subject further, we may say that the final mean weight, without wool, was 174 lbs.; the highest weight, 214 lbs.; and the lowest weight, 147 lbs. The highest average increase per week was, as we stated, the one before particularly referred to, which averaged 4 lbs. 7 oz.; the lowest average being 1 lb. 14 oz., and the general average 3 lbs. 2½ oz.

The increase in twenty weeks per 100 lbs. of live weight took 259 lbs. 11 oz. of oil-cake, 219 lbs. 1 oz. of clover hay, and 3,608 lbs. of Swedes.

Now, the comparison with the Downs of the two kinds before referred to is as follows:—The

	lbs.	oz.
Cotswolds gained per week	3	2½
Hampshire Downs	2	12
Sussex Downs	2	1¾

But there was a difference in the food. The Cotswold consumed more food—more of every kind than the Sussex Downs; and more, though very slightly, of all but the clover hay, than the Hampshires. But then they had a larger frame, and produced greater results. Taking the 100 lbs. increase, for instance, as the test, as it ought to be, the result is in every way in favour of the Cotswold, as the following will show:—

	Cotswolds.	Hampshires.	Sussex.
Oil-cake . .	239¾ lbs.	294 lbs.	314 lbs.
Clover hay .	219 ,,	259 ,,	304 ,,
Swedes . .	3601 ,,	3941 ,,	4086 ,,

The increase in weight per 100 lbs. was about 2 per cent. greater with the Cotswolds.

The "balance-sheet," always so satisfactory, is not here of the same consequence as the experiment. It is not likely, when the animals are so confined and often weighed, that so much can be defined as clearly to make profit a guiding element. The cost of his sheep he makes £66 10s.; the quantity of purchased food consumed by oil-cake and clover hay, £29 6s. 5½d.—a total of £95 16s. 5½d.; while the proceeds of the sale were £92 3s. 7½d., a small difference of £3 12s. 10d. in the lot, with the manure, for the risk, return for capital, land crop, and Swedish turnips; but they were sold at a "heavy" market, and thus may partly account for the loss.

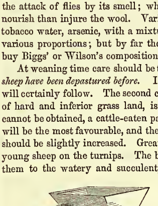
There is one curious fact, in this and the preceding experiments, which we cannot help noticing. Mr. Lawes observes that there is some general uniformity observable in the quantities of food in their fresh state, consumed by all the three kinds of animals, per 100 lbs. live weight weekly. "But when the quantities of the respective foods are calculated each to their contents of dry substance, it is found that the total quantity consumed to a given weight of animal, within a specified time, is all but absolutely the same for the three breeds."

Now this opens to our view a wide field of the most difficult and delicate investigation. Are all breeds to be considered so nearly similar, that they take, per 100 lbs. live weight, nearly the same amount of dry food per week? Of the three dissimilar kinds—at least, two of them—this seems to be correct. How far it is so of the other breeds, time only will decide. But is the farmer to say that they are therefore all alike to him? No such thing. Take the Sussex Down, for instance: it consumed 9 or 10 ounces per week per 100 lbs. weight more of clover hay than the Cotswold; but it consumes several less Swede turnips. Now in some localities, and to some farmers, turnips are difficult and clover hay easy of attainment. Here a class of sheep is indicated, which, if this experiment is an invariable test, will answer his purpose. Besides, weight for weight calculated dry, vegetable matter differs in price very materially; and as this is the real question with the farmer, may he not some day be able to apportion his kind of sheep to his description of food, and thus make profit? We hope so, or what will become of him?

The *fattening of sheep at one year old* must commence with their lambing. Not only must artificial food be given to the lambs as soon as they will eat it—not only must they be tempted to eat it—but they must be supplied with it indirectly before they attempt eating, through the lactiferous system of the mother. Oat, bean, and linseed cake may and ought to be given to the parent animal, so that the offspring may always have abundance of the materials wherewith to form bone and muscle, and even fat. The fattest lamb (other things being equal) not only makes the fattest shearling, but will eat the least amount of food to produce any given amount of mutton.

The late lamented scientific agriculturist and philosophic naturalist, C. Charnock, Esq., gave his ewes rape cake, and so trained the lambs to eat it, and sold them at weights, which the writer hardly dares name, in the following spring. Without discussing whether rape can be equal to linseed, it is very questionable, if these are trained to eat it, whether it does not lay on mutton at a far cheaper rate; and the successful use of it by gentlemen of discernment and skill has convinced the writer that it is a valuable substitute, second only to linseed cake, and often sold at half the price. The hogs at weaning require dipping and superior food. The dipping is performed by three men, who make use usually either of Biggs' or Wilson's composition, and an apparatus is furnished. The whole sheep, except the head, is immersed in the dip-water, which usually consists of materials calculated to destroy the tick, and prevent the attack of flies by its smell; while, if rightly made, it will rather nourish than injure the wool. Various combinations of spirits of tar, tobacco water, arsenic, with a mixture of oil or soft soap, are used in various proportions; but by far the best and least troublesome is to buy Biggs' or Wilson's composition.

At weaning time care should be taken not to place the lambs where *sheep have been depastured before.* If this is done, diarrhœa and death will certainly follow. The second crop of mown red clover, or the fog of hard and inferior grass land, is by far the best food; but if this cannot be obtained, a cattle-eaten pasture, but not of the richest kind, will be the most favourable, and the quantity of food given artificially should be slightly increased. Great care is necessary in confining the young sheep on the turnips. The best mode is gradually to accustom them to the watery and succulent, but very valuable sheep-feeding food. By far the safest method is to cart off a few turnips to the grass, and so gradually accustom the sensitive stomach and bowels to the change before they are absolutely confined to the turnips. When they are kept entirely on the grass-land, and confined to turnips as green food, they should be furnished with an almost unlimited allowance of hay in the racks, and a liberal quantity of linseed cake, rape cake, or barley, per day. A quarter of a pound of each will be sufficient, if well mixed with hay, or a gill of barley, according to the price of these materials in relation to each other. The turnips should all be eaten, and fed off in troughs. This is a great saving of food. Gar-



GARDENER'S TURNIP CUTTER.

dener's turnip-cutter is one which has stood the test of many years, and has not hitherto been surpassed.

By the time the hogs are one year old, and in the March or April after they are lambed in, they will be fit for the fair and the butcher. They are usually shorn before they are sold. For this purpose the *washing* precedes the operation about ten days. A running stream is selected, and if there is not a river sufficiently near, a smaller stream is dammed up to afford the necessary run of water. Two men, usually protected by gutta percha or water-proof clothing, enter the stream. The sheep are thrown in, and the animal, while swimming, is thoroughly washed all over with the hands of the washer,—its own efforts keeping it from sinking. A man will wash three hundred to four hundred per day, if protected as we have indicated. If he is exposed to the full action of the water he will not be able to wash so many. The juices of the sheep form a natural soap, which effectually clean the wool from all dirt and impurity; and care must be taken, after washing, to keep the sheep from all sandy and ploughed fields, or they will nestle and get sand on the skin, and thus spoil the wool. If the weather be fine, in ten days they will be fit for the *shearing*, which is usually performed by the score; and 1s. to 1s. 6d. per score is paid for the clipping, folding up the wool, and making it ready for market.

In cases where sheep are kept as store for one year and fatted the next, less food is usually given. No material artificial feeding is used; they browse on bare pastures for the first year, and have scarcely an allowance of turnips, *ad libitum*, the second. Though not the most profitable, either as regards the flock or the land, in these cases, they have seldom anything but turnips; and as the *growth* of the animal has been effected, it has only to lay on fat and muscle; whereas, in the former case, where hogs were fatted, the food must be given sufficiently in quantity and quality to provide for both.

Various modes of feeding have been adopted to economise time, food, and labour. Mr. Childers established, a long time ago, that house or shed-feeding was a great saving of food. The writer of this treatise was staying with him at Cantley during the experiment, which was most carefully conducted by that excellent man, whose public spirit is more than equalled by his private virtues. The same food was given to each lot—one exposed and the other sheltered in a walled and well-littered yard;—27 stones of turnips, 10 lbs. of linseed cake for each lot, and half a pint of barley per sheep per day, with a little hay and salt to go to, were given; but soon the sheltered sheep eat less by 3 stones of turnips per day than those exposed, and ultimately 2 stones more, as well as 3 lbs. of cake per day. The result was, that in three months two field-fed sheep had increased 36 stones 8 lbs., and the shed-fed 56 stones 6 lbs.—a difference in twenty sheep of just 20 stones live weight!

This experiment gave the example for general imitation, and has divided sheep-feeders into several classes; viz.—the field-feeder, who values the consolidation of the animal's kneading, and feeds out of doors. Amateurs, like Mr. Mechi, advocate *board-feeding*, or houses with hollow floors of boards, set on an edge sufficiently near to prevent the sheep's feet from falling through; and one from his Cotswolds may be fat at one year old. But his wheat was throwing out on his light land; and while he was confining his sheep, to save expenditure of food by exposure and exercise, we observed a boy driving them over his wheat crop to prevent its destruction for want of treading. As we disapprove of board-feeding, except under very special circumstances—strong clay land, for instance, or some equally potent physical preventative to the feeding out of doors—we think it fair to give the opinion of a gentleman who warmly advocated it,—we mean the Hon. Captain Dudley Pelham, who, however, is far more sensible than many who advocate the plan, as he recommends its partial adoption only, carrying half of the produce to the shed, and consuming the rest in the field,—a plan far preferable to the carting of the whole—carrying back the manure, and losing the consolidation of the animal's feet,—so invaluable, nay, so indispensable to light land cultivation.

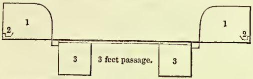
"The sheep," he says, "should be upon gratings, made with oak frames and deal tops, three-quarters of an inch between the bars. Beneath the gratings, which should be supported on either side, without cross-supports, which are inconvenient in emptying the pit, should be a tank or pit in brickwork, or rammed with marl, not less than two and a-half to three feet deep, so as to contain all the manure dropped by one lot of fattening sheep; thus avoiding the necessity of disturbing the animals for the removal of the manure."

Captain Pelham recommends gypsum to be thrown over the gratings to prevent unpleasant smells, and that the sheds should be even cooler than those intended for oxen, 45° being the point he considers to be aimed at, while those of oxen he thinks should be 50°. The size of the pens he recommends to be eight feet by six, and to contain six Down sheep.

The quantity of food eaten by fifty Down sheep he estimates at two tons; and sheep in these sheds he conceives will feed in about twelve weeks. He has had sheep for three weeks increase at the rate of 4½ lbs., and each animal will make, he calculates, 2 cwt. of powerful solid manure.

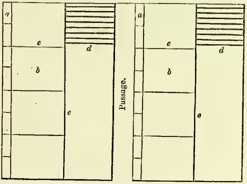
Stall-feeding sheep is a step still more in advance even of this, and, though inapplicable to young sheep, is practised with considerable success by Lord Bathurst at Cirencester, and skilfully carried out by Mr. Anderson. The following is a plan of the building, furnished to the writer by that gentleman.

SECTION OF LORD BATHURST'S SHEEP-HOUSE AT CIRENCESTER.



1 1 Board Divisions. 2 2 Troughs. 3 3 Drains.
Scale of 6 *feet to an inch.*

PLAN OF LORD BATHURST'S SHEEP-HOUSE.



a Troughs divided in the middle. *b* Pens for four sheep. *c* Division Board. *d* Gratings over tank. (Spars of grating two inches broad, one inch interval). *e* Frame to support grating.

The house holds eighty-seven sheep. About two inches of turf or wood-ashes are put at the bottom of the tank, No. 3, to absorb the moisture, and a little of the same ashes thrown over the grating daily, with a little gypsum, and the dung well swept into the tank through the grating *d*. If the ewes eat white turnips, the quantity of urine is very great; if Swedes, it is less. When the lambs are cleaned out, the manure is put in a shed, mixed with a little salt and gypsum, frequently turned, when it is mixed with guano, bone-dust, &c., to drill for turnips. Every sheep is led by the hand with a collar and string, which works in a staple, similar to the mode in which horses are led. The sheep here has all the privacy, quiet shelter, and warmth she requires, with the gregarious principle still gratified; and though at first sight it seems unnatural to confine sheep by the head, we have no doubt but for ewes the plan has decided advantages.

As to the *comparative economy of feeding sheep at one or two years of age*, a deal may be said on both sides. While the early maturity has quick returns and rapid turning over of capital, it is said to have smaller profits. But in these times, when small sheep are decidedly worth more in the market than large ones per pound, and almost as much per head, the balance of favour will hold to the fattening at one year old. The writer of this made a calculation of the difference of produce of mutton to the nation by the two modes in the *Farmers' Magazine*,* showing that during the two years the two-year-old feeding system was in operation, the produce would be, on thirty acres of land, 7,800 lbs. of mutton; and the same area of land would produce 11,600 lbs. in the same period by the one-year-old system, thus showing a gain per annum of 1,900 lbs. of mutton on thirty acres of land to the community.

He further calculated the comparative advantage to the feeder—a question which is of the greatest importance, and will always have the greatest weight; and he showed that with mutton at 6d. per lb. the one plan would leave a profit on the two years—out of which the rent was to pay—of £62 10s.; while that of the one-year-old system will leave a profit of but £59 4s. The figures and calculations are by far too voluminous to enter in this treatise, which is intended only as an epitome; but the change in the demand for small mutton, since the period when these calculations were published,† will somewhat modify the calculation, and give the turn in favour of the one-year-old system,—a course, it will be seen, which is only perfectly right, as more capital will be required in the one year than in the two-year-old system.

The *comparative feeding properties of large and small sheep* of the same county has been a matter of much contention. Nobody will seriously doubt that a large sheep will, other things being equal, consume more food than a small one. The question is argued and re-argued between the advocates of Leicester and of Lincoln, as we have seen it is between the Down and the Hampshire breeders. Mr. Shakel, of Reading, made an experiment, which gave the palm to the large and coarser kinds; and we hope it may operate with breeders, both of Leicesters and of Downs, to prevent their aiming at sheep so extremely diminutive. Indeed, the public taste, though in favour of small animals, had rather have more muscle with the fat, than all fat and no muscle. Mr. Shakel purchased 100 large Hampshires at 41s. per head, and an equal number of small Downs at 35s. They had all turnips *ad libitum;* and on being sold out, after about six months' keep, the Hampshires, which cost 41s., sold for 61s. 3d.; while the Downs, costing 35s., sold but for 49s.—showing a difference in favour of the large, and for the extra food doubtless eaten by them, the sum of twelve shillings and threepence per head. The lambs were said to have had the same area of food given them each day, but it is hardly possible but that one might have wasted food, while the other ate all up. It does not *necessarily* follow, however, that larger animals *must* invariably consume more food. That question will depend very materially on the excellence or otherwise of the breed.

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* Vol. XX., p. 105.

† July, 1849.

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CHAPTER X.

DISEASES AND THEIR REMEDIES.

THERE is nothing in the whole range of domesticated animals so difficult to manage as the sheep under disease. In acute diseases the use of remedies seems to be utterly in vain. Disease then seems to be ungovernable. The power of known remedies seems to be exerted in vain; and this is of less consequence now, happily, because the system of management is so well understood, that the animal is always kept fat and ready for the butcher, in order that, on the first symptom of illness, he may be sent off and slaughtered before the disease has affected his vitals, and little or no loss will take place. But if otherwise, let sturdy, or rot, or inflammation take place, and you may administer all the medicines in the world, and no effect will be produced.

The shepherds should—especially during winter, when the animal is much more subject to disease than in the spring or summer—keep a most watchful eye over the flock by watching the appearance of every individual member amongst them. If one looks dull, and refuses to eat with the rest; if he hangs off and wanders listlessly to the hedge; or if he contents himself with smelling at his food without eating; or lies down when all the rest are standing or feeding,—the probability is that he is about to cause some trouble; and if allowed to remain a few hours, death may supervene. But if he droops his head, looks round at his sides, and especially if he droops his ears, it is certain he is ill, and he must immediately be sent to the butcher if he is fit to kill.

If the animal be absolutely lean, it may be tried; but, in the majority of cases, it is perfectly useless to make the attempt.

If a sheep looks suspicious, and there is some doubt in the shepherd's mind as to whether it is ailing or not, it is by far the best immediately to take it into the fresh turnips. The roaming propensity of the sheep is soon visible. If it be well, it will instantly begin to devour the fresh food, and may immediately be taken back to its congeners on the break, and left with unconcern; if it refuse, it is best to consign it at once to the butcher. The only care to be taken is to observe that there is no local cause for the complaint. A thorn in the foot, a swelling in the mouth, an awkward tooth, or even a thorn fast in the wool, will often make the appearance of disease, and sometimes possibly induce a little fever; but these local causes of illness removed, the general health will soon be restored.

We now proceed to describe a few of the most common diseases of the sheep; and, before alluding to those which are properly such, we will mention parturition and castration as states not exactly of health, but where medical, and often surgical, care is necessary.

Lambing, as we have said, usually takes place twenty-two weeks after conception. It may happen at twenty-one—it may be deferred to twenty-three; but, within a day or two, the period first named may be fixed as the average. In ordinary flocks it usually takes place between the 25th of March and the 6th or 8th of April,—those not lambed by that time being the animals which have come over, and which will be expected to lamb three weeks later than the rest. Provision should always be made for the shelter of the ewes from the cold and wet weather, which too often prevails at this period; and huts, such as we have previously described, are amongst the best possible arrangements to make, at this season, for the tender and delicate offspring and for the feeble mother. When the flock is sufficiently numerous, they should be under the care of two shepherds. One should watch and tend them by day, and another by night, and take alternate day and night watches; while the watcher should rouse the sleeper in cases of difficult parturition, weakly offspring, or other casualty. The first symptom of lambing is, that the ewe will single off. She begins to "pain herself,"—to show externally the throes of parturition; and, in more or less time, the first water will come—a fine small bladder filled with a whitish serum. After this it is quite possible she may again commence eating; the lamb comes no more forward, and she may remain for hours a source of anxiety to the shepherd lest all should not be right. By and by she again retires; a thicker bladder comes filled with a yellower liquid, and the feet and head of the lamb either begin tō be visible, or to be at least within a short space of the external labia. If difficulty now take place, mechanical assistance should be given;—not violent pulling, but gentle and firm assistance; and, in ordinary cases, this succeeds, and the animal is safely delivered. When she is allowed to rise, the hand may be put in front of the udder, and it will be easy to feel if another lamb may he expected. In case there is, it is best not to suckle the first lamb till the other is produced, or it will get an undue share of the milk, and thus rob its less fortunate brother. If, however, the first lamb be feeble, it is desirable to suckle it as early as possible; otherwise it may be a source of considerable inconvenience.

But parturition is not always a matter so easy. The lamb may come either with only one foot, with the head without feet, or with the hind legs only. The latter is a matter of less consequence than the former cases. In any case, if the uterus be sufficiently expanded no damage will take place; if not, there may be great difficulty. The first effort should be to put the lamb right; a little gentle and judicious putting back will sometimes enable the operator to effect the object. In other cases, where the head is distinctly bent back, we have known a noose put round the under jaw without the slightest difficulty. A crooked-necked lamb will often be a source of difficulty. It will be difficult to lamb; and when it is so it will often baffle all efforts to make it suckle. A very judicious friend of ours, a successful breeder of sheep, informs us that he makes a point of always marking and putting off the mothers of every crooked or "gyenecked" lambs, and thus has very seldom any one in his flock,—traceable possibly, when it does occur, to the tendency to that failing in the male animals which he purchases.

Sometimes, though very rarely, the mother will disregard or forsake a feeble lamb. If the former is accompanied by indisposition to feed, it is often a sign of illness, and some shepherds go so far as to predict it as symptomatic of death. It may, however, be mere waywardness. The wild animals will forsake a sickly young one; they will gore to death a feeble companion, lest he should become a prey to ignoble animals; and the ewe often so far remembers her undomesticated nature as to neglect, or forsake, or ill use one of her lambs as it approaches her. The best remedy is to smear the outcast well with the matter on the skin of the other, which will sometimes deceive her. If not, she will have to be confined, and the lamb regularly suckled, until a new mother is found. Want of milk is generally the cause of this sad disaster, and it is usually best to attempt to affiliate the lamb on some subsequent ewe, which either has lost her lamb, or has a single lamb only, and plenty of milk. In the latter case, smearing the foster lamb with the matter on the skin of tho proper offspring is all that is necessary; in the former, the skin of the dead lamb, put lightly over the living one and foster lamb, will, in almost every case, effect the object.

The *diseases subsequent to Parturition* are inflammation, and even gangrene, of the uterus, puerperal or milk fever, and garget or inflammation of the udder.

After difficult parturition, and where much manual assistance has been necessary, the labiæ of the uterus and vagina are sometimes ruptured. In cases where there is no other hope, a veterinary surgeon will divide the ligatures. We had a most successful operation of this kind performed by Mr. George Holmes, late of Thirsk, and now in India; and we never saw the ewe recover faster, even when no difficulty had occurred. In this case the passage was inadequate for even one of the feet, and would not admit the finger.

When ruptures of the vagina take place, the following dressing will be of service, known extensively as the "Driffield oil," or black oil:—

Take of olive oil	1 pint.
Spirit of turpentine . .	2 ounces.
Sulphuric acid . . .	6 drachms.

They are safest mixed in a stone jar; as great heat will be generated during and just after the mixture. When cool, it may be put in a bottle for use.

If an appearance of mortification or gangrene occurs, a more decided application will be necessary, and the farmer will not be at all at home. If the ewe can be then saved, it must be by a veterinary surgeon.

Garget, or inflammation of the udder, is a very common, painful, and sometimes fatal disease. Warm fomentation in the first stage, and being well rubbed with marsh-mallow ointment after each fomentation with a warm, dry towel, will be the best local application, while an internal medicine, composed of

Three drachms of nitre,
Two of cream of tartar,
Dissolved in four ounces of lukewarm water,

may be given with advantage. The black oils may be used, after the first few days, to promote suppuration of the matter formed in the udder, and, after it breaks, a dressing of tincture of myrrh.

Puerperal fever is far more common in the cow than the ewe. In the latter it sometimes occurs. The medicine prepared for acute garget will be found useful, and may be given in general; or, which is better, the following may be administered :—

Epsom salts	½ ounce.
Tincture of opium	1 drachm.
Camphor pulo	½ drachm.

This medicine is recommended by Professor Spooner after *abortion*, —a complaint sometimes incident to ewes when kept exclusively on turnips.

Castration, when performed on *lambs* about a month old, is a very simple operation; and, though often performed in a manner somewhat barbarous, may be elegantly done by a kind of combined knife and forceps, invented by Mr. Nelson, of Highfield, Sheffield.

An attendant holds the lamb with a fore and hind leg in each hand, the back of the lamb being kept close to his breast. The operator cuts off the end of the scrotum, presses on the bag till the testicles protrude, and either seizes the testicles with his teeth, one by one, or more elegantly by Mr. Nelson's forceps,—and no more trouble is necessary than to confine the lambs for a night or two, if the weather be frosty.

Proceeding to the castration of aged *rams*, the operation is more difficult. After ascertaining that there is no rupture, both the testicles, which are very large, are inclosed and held tightly together by iron clams, and the testes are divided in a line with these by the cautery. Other methods are adopted, but this is by far the most popular. Mr. Wilkinson, of Sowerby, uses two sticks united at one end, into which he incloses each testicle, the inner part of the sticks being smeared with a solution of sulphate of iron. He then ties the other end of the sticks, and cuts off the testicle. In twelve hours the sticks are removed by cutting the string, and all the vessels are thoroughly cauterized. The mode has struck us as a great improvement on the cautery, and it is certainly more elegant.

We now proceed to diseases of a less symptomatic character, and the first and most dangerous is the *Rot*. On the causes and treatment of this, volumes have been written; but whatever may be the ultimate cause of the flukes in the liver, it seems to be quite clear that drainage is fast banishing the rot out of the country. The main feature of the disease is, that the solids of the body become gradually watery and flaccid. It is, doubtless, owing to some water-grass, and the peculiar state of the system is a favourite nidus in which the fluke is generated,—its germ till then living in a normal state. It has been said that a single feed of the grass will produce the disease.

The best preventive to the disease is an allowance of plenty of dry food, with salt *ad libitum*. We know a farmer, in Cleveland, who saved his flock of Teeswaters in a rot year, which almost denuded that valley of its sheep, without any other exception than his own flock. They had constant access to the hay-stack, and so were preserved amongst the general ruin. When the rot unhappily sets in, it is by far the best to sell the whole of those which are at all fit for the butcher for immediate slaughter.

The *Sheep-pox* was introduced into this country by the Continental sheep, and is a disease very destructive to the flock, and highly injurious to those animals which recover from it. Inoculation has been recommended by Mr. Stanley Carr, and seems to have a tendency to make the disease less virulent. Vaccination has also been adopted; and in an extensive experiment only one-fifth of the flock, of 1,500 and more, escaped the disease by the precaution.

The *Sturdy* is another incurable disease, arising either from water in the head, hydatids in the brain, or other disease of the latter organ. As the fattest sheep are usually attacked, and as the disease is incurable, the animal should at once be sent to be slaughtered; for the mutton is not impaired in the slightest degree.

Diarrhœa is a disease which sometimes becomes epidemic. It is most common in hogs or young sheep, and is often caused by improper food, as will be seen by our remarks on weaning lambs. It generally arises, however, from rapid changes of food. We hardly ever knew two teaspoonfuls of sulphur fail of producing the effect, when administered in gruel in time; but if the first stage is over, it will require more vigorous means. A dose of linseed oil, say two ounces, with two grains of opium to allay the irritation of the bowels, will often answer the purpose; but if the disease should still prevail,

An ounce of prepared chalk,
Half a drachm of opium,
Three drachms of ginger, and
Two ounces of port wine,

may be given in a gill of gruel with great advantage.

The *Foot-rot* is one of the most obstinate and powerful local diseases to which the sheep is subjected. If not taken in time, it is difficult to cure; and if the diseased are not kept assiduously from the sound, the disease will be for some time an obstinate attendant on the flock. The infected sheep should at first be carefully examined, and all the diseased parts cut completely away. A dressing should then be applied of the following mixture :—

Corrosive sublimate	1 oz.
Sulphate of iron	1 oz.
Muriatic acid	1 oz.
Sulphate of copper	1 oz.
Coarse turpentine	1 oz.
Sulphuric acid	1 oz.
Spirit of turpentine	1 oz.
Sheep ointment	4 oz.

This mixture, simple as it is, is sometimes a necessary application. The sound portions of the flock should have all their four feet dressed with tar, and should be kept all night on a floor smeared with quicklime. As the diseased sheep approach convalescence, they should be carefully watched, and dressed, if required, daily.

The *Scab* is a disease of the skin, arising from the presence of minute insects, called *acari.* The German naturalists trace the disease to the actual fact of the *acarus* burying itself in the skin of the animals. This insect must be destroyed, and the sooner the plague is detected the better. The following ointment rubbed in, the wool being first shed longitudinally, and at about four inches apart, will often be successful :—

Sand	2 lbs.
Sulphur	1 lb.
Spirit of tar	½ lb.

The *Blind*.—This is a disease of the eye, and soon becomes epidemic. The eye is at first a little inflamed, and soon becomes opaque. The animal suffers dreadfully, and is reduced both in frame and condition. To smear the eye with tar will relieve the pain, and abate the inflammation; but it will often remove the wool, and cause the animal to be unsightly, if he is for sale at any early period.

Such are the principal diseases of the sheep. To such as inflammation of the chest, bowels, &c., we have not alluded; as the resources of the farmer are here perfectly useless.

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